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EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

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EDITORIAL NOTES.

Cost of Labour and Materials and Gas-Plant Contracts.

We are a people who are to-day largely fed on generalities, and talk in generalities, regarding those things which bear upon our everyday life, and about which the public know very little. They get it summed-up in the increased claims that are made upon their pockets; but to ask them to believe that the charges to be paid by them genuinely represent the increased costs of production, through the higher costs of labour and materials, they regard as merely a temptation to credulity. They know broadly that the higher costs of labour and materials are partly to blame; but for the rest they firmly believe that the instinct to profiteer when opportunity offers has had abnormal growth during the past four-and-a-half years. The real facts require greater publicity. The view of the general public is not without reflection in the minds of some gas administrators and engineers. They talk glibly of reconstruction, of renewals, and of extensions. They know costs have advanced, and that heavily; but many of them are quite in the dark as to the actual facts. Revelation does not come until they receive tenders from the manufacturers or the contractors; and then they are prone to think that, by avarice, they are being made the victims of circumstance. They are simply appalled by the prices that are asked for plant of any description. It is nothing for a carbonizing or other plant of a given capacity to be at least double the pre-war price. If they reflected, they would appreciate that what the gas industry has suffered internally in increased labour costs and prices for coal and other materials is a condition that has permeated every industry; and that the manufacturer of gas plant has had his heavily increased costs for labour and coal, and the sources from which he draws his supplies of high-priced raw materials—iron, steel, or other metals, bricks, stone, timber, or other goods, unwrought or manufactured—have also had theirs. Cost accumulations commence at the very place from which the raw material has its origin; and it is the manufacturer who finally comes into contact with the customer for the finished plant who has to bear the odium of what is regarded as a charge unreasonable and indefensible.

Manufacturers and contractors, in their own interests, wish the position were otherwise; and those associated with the gas industry are no exception. As a matter of fact, their interests and future are so strongly bound-up with those of the gas-supply industry that what is detrimental to the latter is detrimental to them individually. We know that they are being inundated with inquiries at the present time. Some of them, perhaps all of them, could show inquiries as to whether they can carry out tenders now at prices quoted before the war. The inquirers must have known full well that such a question was futile and even frivolous; and the emphatic "No" received merely conformed to their expectation. The manufacturers and contractors would be only too pleased if they could undertake the work on offer, and at prices less remote from those that ruled before the war began. Not only are the costs of labour and materials against them, but supplies of materials as well; and their would-be customers—especially in the gas industry—have their difficulties in the matter of loan and capital raising. The talk of the Government, as to easing the means of raising capital and obtaining loans, is all right in a way. But the licences to issue capital or to raise loans are not easy to get; and, when they are obtained, it is dear capital which has to be spent on plant at double pre-war cost. Then, again, the acceptance of a contract to-day is not a guarantee that the final cost will be the figure named. Manufacturers and contractors are prudently protecting themselves by quoting on a sliding-scale; for they, like gas engineers, do not know what the morrow is going to bring forth in these times of erratic movement. If the costs to them of labour and of materials are already doubled, the balance will be further turned on the wrong side should there be compliance with the demand excesses of miners, railwaymen, transport workers, and others. The manufacturers and contractors are living in just as precarious conditions as are their customers; but the latter sometimes overlook the fact.

We have indicated that, taking one thing with another, the costs of labour and materials for plant construction have about doubled; and it would be absurd to refuse to recognize the fact that authorities do not see any prospect of a decline for some time to come. We would be the last to say this if there was even a ray of hope of the reverse being the case. The position is as bad for the plant makers as for gas-works. They cannot repair, renew, or extend their own plants, except at like heavy costs; and they, too, want money, materials, and labour for the purpose. Many of the readers of this article must have noticed as we did the other day this item of news in the daily papers: "A five days' sale "was concluded yesterday at Birmingham of plant and "machinery belonging to the Ministry of Munitions at the "works of the Austin Motor Company. A number of the "items fetched considerably more than their cost price. "Six Lancashire boilers, which before the war would have "cost £450 each, realized £1350 to £1475 each." With such conditions facing them, our manufacturers are indisposed to make any very considerable commitments at great expense until they know approximately what is their situation, not only in the matters of labour and materials, but of so-called excess profits arising from enterprise in expansion of production. In another direction, gas-plant manufacturers and contractors are being hard hit. Before the war some of them were, to the benefit not only of themselves but of the country, extending their export business. The war interrupted; and the present condition of labour and materials is altogether preventing any chance of effecting direct from home a juncture with this work as it was left in 1914. Those who are keen are now sending out a staff of engineers and draughtsmen, who are establishing themselves in the countries concerned, with the view of making the plant there, and carrying out the contracts. There is no alternative. There is a lesson in this for labour at home. It is a loss to the volume of the country's work; it is a loss to its revenue; it is a loss to home labour. But it must be done. America in many directions is coming out as big competitors of British manufacturers. America pays good wages; but the men do more work than our men at home, knowing that production not only creates employment, but enables the payment of high wages. There is no question about it that the conditions—in respect of finance, labour, and materials—in which the country finds itself submerged are simply crippling it to-day.

The Government do not seem to realize this; they do not seem to realize that the crippling conditions are actually present. They talk as though the crippling is a thing to come if the new demands of various sections of labour are conceded, and if claims as to still higher wages and further reduction of hours do not cease. There is the bald fact as regards the gas industry, that the costs of its manufacturers have about

doubled compared with pre-war prices. We have before us actual figures from a gas-engineering firm. We take the wages paid now to fitters, turners, foremen, draughtsmen, and others; and find, in comparison with 1914, that the larger proportion of them have risen by an average of 110 p.ct. Steel girders, which before the war cost £7 9s. 3d. per ton, have lately been bought in substantial quantity at £14 12s. 6d.; and ¼-in. steel plates, purchased before the war at £7 11s. 3d. per ton, have been lately bought for £15 10s. But it is questionable whether the next purchase will be at this rate. The girders and plates were bought at a works which has been receiving a subsidy from the Government. This has now been stopped; and intimation has been made that the price for the next order will be higher. Of course, the demand is enormous for steel plates for the shipbuilding industry, and will be for some time to come. Brass and all other metal goods have gone up in practically like proportion. The same firm are at present paying for coal exactly double the 1914 price. Again, English hard wood for pattern making, &c., has risen from 4s. 6d. to 12s. per foot cube. Against 15s. 6d. per ton for lime for building, 34s. is being paid to-day. Portland cement per ton cost 42s. 6d. in 1914, compared with 70s. now. Red bricks for building per 1000 have flown in price from the £1 10s. of 1914 to £3 3s. 9d. All fire goods have advanced from 80 to 100 p.ct.; and the wages of bricklayers and labourers are up by about 100 p.ct. This particular firm buys in large quantities, so that the prices given here may be taken to be on the low side.

Need any more be said to show why at the present time the cost of gas plant is about double what it was in 1914? The figures quoted are actual and convincing; and they confirm the helplessness of the manufacturers. They are as much the victims of current circumstances as are their customers—the gas undertakings. Most of this is due to the farcical manner in which the Government have dealt with labour during the war. Concession after concession has been freely made. Many of the arbitrations have been little short of a pretence at judicial procedure and decision. As plainly as the Government could by their actions, they invited or incited men to ask for more; and the men have not failed to do so. The employers have been rendered absolutely impotent in these matters. We are reaping the harvest of all this dissoluteness in dealing with labour matters. The gas industry are reaping among all the rest; and it is an industry that has suffered heavily. It has given much during the war. The measure of the gratitude of the Government is shown by the disastrous position of gas capital values and the return upon the capital, and the ill-consideration that is being given to it now in other directions. We hope the new Parliament will realize these things; and that in it (and this early) something will be done to restore to the industry the financial soundness which was its reputation before the war, and should have been enhanced, and not depreciated, by what it did during the war.

A Full Programme for the Institution Meeting.

The indications are that the President (Mr. Samuel Glover) and the Council of the Institution intend that the next annual meeting of the members shall be on a scale which shall match the best of precedent. The meetings we have been having since the Liverpool one in 1914 (exception must be accorded to that of last year, which gave us Lord Moulton's brilliant awakening address, the notes of which will reverberate again and again as the tasks are dealt with which confront the industry) are nothing more than weak links between what was and what must be. It is right and proper that, hostilities having ceased, we should get back to work in the old, and (this should not be beyond the power of initiative and skill of gas engineers) even improved, form. For it is very widely recognized that the Institution has not lived-up to its opportunities, technical or otherwise. Again, three days have been allocated to the meeting; and it is to be a little earlier this year—that is, Tuesday, Wednesday, and Thursday, May 27 to 29.

It is to be a very full meeting. We may rely upon Mr. Samuel Glover putting good work into the Presidential Address. There will be reports from the various Committees, including a further one from the Gas Investigation Committee. The preliminary announcement also tells us that "several" interesting communications have already been accepted for reading and discussion. But apparently the Council are not yet satiated; for they intimate that they "will be pleased to receive other offers at an early date, "with a view to the completion of the programme." The inlet-valve is not to be closed there. A question paper has been distributed, in order to give facilities to members for calling attention to any subject in which they may be particularly interested, and on which they desire to ask questions of the President or the Council. The possibilities of this innovation are great; and there is not a shadow of a doubt there are a good many interrogations which members would like (whether they will do so is another matter) to put to the President or the Council. A word of warning. The Council will require a "controller" over them if they proceed at this rate with the arrangements for the meeting. "Several" interesting communications having already been accepted, and reports from Committees being assured, some measure should be taken of provision in relation to time; for in the past there has been as much dissatisfaction through having to slur-over prepared communications of excellent quality, owing to lack of time, as there has been in bringing members together to a meeting to listen to three or four second-rate papers and inane discussions which would not have been a credit to a less imposing District Association meeting. In addition to the Committee reports, two or three good papers on subjects that are of outstanding importance in these days when we should be thinking and conferring together on constructive matters would be far better than an overload which would strain time and patience, and attenuate result.

However, the President and the Council show that they are very much in earnest in their efforts to make the forthcoming meeting an outstanding success. In one or two other ways, we are to get back to old times. It is hoped to see some guests from abroad; and the President and Mrs. Glover are arranging a reception and dance. We shall be glad to shake-off the restrictions, enforced and adopted, of the past four-and-a-half years, and to resume the liberties of peace time, though accompanied by increased responsibilities. Speaking of guests from abroad, an intimation has been received from the Société Technique du Gaz en France that they are proposing to organize for the autumn (and in Paris) a special reception of Gas Associations of allied countries. Well before then we hope for the ratification of Peace; and nothing would give greater pleasure than for representatives of those who in the gas industry have, in the field or at home, worked for that Peace, to exchange greetings and congratulations in the great city in which to-day are being discussed the conditions which are to mould and preserve our international relationships.

L.C.C. Activities in Obstructing Gas Progress.

Our industries are being solemnly charged to increase production, and to make the utmost use of the resources of the country. The Public Control Committee of the London County Council and its Chairman (Mr. A. L. Leon) are appealing to all who will listen to set back the clock so far as the gas industry is concerned, by compelling the reimposition of old standards, which would at once reduce the productivity of each ton of coal handled by the gas undertakings. As we have remarked before, the Government will have to choose between progress in making better use of coal than hitherto, and those who would obstruct such progress. The gas industry wants to send into its mains for distribution in gaseous form as many B.Th.U. per ton of coal as is reasonable, having regard to the diverse uses to which gas is put; and many gas undertakings are desirous of placing at the disposal of the country the benzol extracted from the gas, seeing that it has greater value as a power than as a heating agent. Whatever revenue, too, is produced from it will go to reduce the net cost of the gas-manufacturing materials, and from which reduction the consumers will benefit. With permanently higher costs for manufacturing gas, every economy must be secured; and the policy of local authorities—the London County Council among them—should be to see that, in the interests of the consumers, no economy is missed.

The report of the Public Control Committee of the London County Council, which was briefly noticed last week, and to a greater extent this week (together with some remarks upon it by Mr. A. L. Leon, which we have reproduced *literatim* for the interest of our technical readers), has been, with its recommendations, adopted by the Council. This means that pressure is about to be brought to bear, through the Board of Trade and members of Parliament, to get the

Order of the Ministry of Munitions of June 28 withdrawn, so that the supply of 500 B.Th.U. gas can be insisted upon, and a spoke be put into the wheel of recovery of benzol. The Committee would also like to see some limit placed on the inert constituents of gas. We are not by any means favourable to avoidable inerts; but there are many matters which have to be taken into account in judging, in every individual case, and in the interests of economical gas production per ton of coal, how much is avoidable and how much is unavoidable incombustible gases. The "pump" to which Mr. Leon alludes is not the only cause. His explanation as to their presence lacks as much incompleteness as the report of the Committee. The first part of this deals with financial matters in association with the Statutory Undertakings (Temporary Increase of Charges) Act; and there is a connection between the first and second parts. The South Metropolitan Gas Company are quoted as an exemplar. The calorific power of their gas was maintained during the war by the facts that they did not supply, per ton of coal carbonized, so much material for high explosives making for war purposes as the other companies, and that they had no water-gas plant to help to relieve the coal situation. The Public Control Committee do not refer to the connection that there is between the financial part of their report and what they have to say as to gas quality. This connection is not what they intended. What they obviously desire is to prevent the companies charging the gas consumers any more than is required for dividend purposes under the Relief Act. If the Committee will glance back to June, 1914, they will see the South Metropolitan Gas Company were supplying gas at 2s. 2d. per 1000 c.ft., the Gas Light and Coke Company at 2s. 6d., and the Commercial Gas Company at 2s. 4d. The capital position of the Gas Light Company always warranted a higher charge for gas than that made by the South Metropolitan Company. But at the end of December last, the South Metropolitan Company were charging 4s. 4d., the Gas Light and Coke Company 4s. 4d., and the Commercial Company 4s. 2d. The South Metropolitan Company have not, therefore, maintained the difference in price as compared with the other two Companies. The South Metropolitan Company have doubled their 1914 price. If the Gas Light Company had doubled theirs, it would have been 5s., instead of 4s. 4d.; and if the Commercial Company had doubled theirs, it would have been 4s. 8d., instead of 4s. 2d. The best way of ensuring a charge of 5s. North of the Thames would be by following the policy of the Public Control Committee as reflected in the report. The circumstances by which the Commercial Company have been able to reduce their price to 3s. 8d. were stated in the address that the Chairman made to the proprietors at the recent meeting.

The Committee also call attention to the fact that the Gas Light Company at the end of the year increased their carry-forward by £129,700, and the Commercial Company theirs by £8939; while apparently it is considered to be good conduct on the part of the South Metropolitan Company not to have made quite sufficient to pay their dividend, and to have no balance in hand. We get an inkling as to what the Public Control Committee are driving at at the end of this section of the report, where they remark that should the increase of the carry-forward "be permitted during the "present period of fixed dividends, the companies would, "out of the present burden on the consumer, obtain an "unfair benefit when sliding-scale conditions are resumed." Perhaps the Committee will note that the carry-forward of the Gas Light and Coke Company at June, 1914, was £535,314; so that even now the £380,744 is short by £154,570 of the balance in hand when the war commenced. It would be interesting to learn whether the carry-forward is considered by the Committee to be for these times in excess of what for a business of such magnitude prudence sanctions. It is customary for Parliament to allow a carry-forward equal to a year's dividend; that of the Company is insufficient to pay a year's dividend. Now as to its prudence. Since the report of the Public Control Committee was drafted, another 5s. has been placed on the wages of gas-workers, miners are asking for more money and shorter hours, and the prices of other materials show no inclination to recede. Instead of a stronger carry-forward imposing any burden upon the gas consumers, it is a protection, and assists to distribute the burdens of these erratic times. We are not making comparisons with the South Metropolitan Company in any derogatory spirit, but only to show Mr. Leon and his Committee that wrong conclusions must not be drawn from the relative positions of the Companies. Can Mr. Leon guarantee that the South Metropolitan Gas Company will not, with an empty carry-forward, and the new wages obligations, have to further raise the price of gas, unless they again trench upon their reserve fund or economies come to hand which are not at present discernible other than in the directions of the insurance of the colliers, and the economy of better running? Are the Public Control Committee still of opinion that present charges are in excess of what they should be? The information as to the further increase in the wages of gas-workers was well known before Mr. Leon made his speech at the County Council meeting on Tuesday last; but he did not mention it as a matter which very much affects the Committee's report.

It has been seen from the foregoing that, if the Public Control Committee accept the South Metropolitan Gas Company's working as a standard, they must agree that the price of gas should be doubled in the case of the other Companies, especially the Gas Light and Coke Company with its heritage of heavier capital per unit of output. The Committee fasten on the paragraph in the last report of the Directors of the South Metropolitan Company, in which reference is made to the retention of benzol in the gas, and in which connection it is stated that, had the Company reduced the quality of the gas to the standard allowed under war conditions, the consumers would have required at least 10 p.ct. more gas to give the same amount of heat. We dealt with this paragraph in the editorial columns of the "JOURNAL" for Feb. 11 and 18. It is unnecessary to repeat what was then said. But it may be pointed out that the "standard "allowed" of 450 B.Th.U. was not reached by either the Gas Light or the Commercial Company, as is shown by the average figures in the Committee's report. The accounts of the consumers of these Companies do not exhibit a 10 p.ct. increase; and record is plentiful that the accounts of other gas companies' consumers do not show anything of the kind. As a matter of fact, there has been a general decrease in consumption, due to rationing, but varying in total amount according to the local demand for industrial, shop, and domestic purposes; and the domestic purposes again show variation in relation to the proportion of prepayment consumers. These consumers were practically unaffected by the rationing, and burned gas *ad lib.* With the South Suburban Company, the increased demand by penny-in-the-slot consumers in the first three months of the operation of the Order was only 1·2 p.ct., while the shilling-in-the-slot consumers showed a reduction of 6·57 p.ct. The Wandsworth Company's prepayment consumers burned 2 p.ct. in excess of what they did before. The Committee should try to reconcile actual experience with the 10 p.ct. computation before they pin their faith to it as representing what actually occurs under conditions of everyday domestic use. All the efforts at reducing consumption by rationing ought according to them to have been wiped-out by the lower calorific power gas, while, as a matter of fact, the reductions among ordinary consumers were extremely heavy. We will not deal with certain remarks in Mr. Leon's speech which make conspicuous invitation to comment, but are obviously due to an inappreciation of the position.

The gas industry must be progressive in its work; it must make, under the new circumstances of costs, the utmost out of every ton of coal used. It is a national necessity; and it is to the interest of the consumers of gas. The industry must therefore be insistent in its appeal to Parliament to do away with the old thraldom under which carbonizers of coal operating under statutory powers have been working, and which such bodies as the Public Control Committee of the London County Council would perpetuate. The question one would like answered is, Why?

Gas and Housing Schemes.

WE are promised a brighter and happier country. Everybody hopes the promise will be fulfilled, and that the means to our social regeneration will not produce a contra-account of such dimensions as to heavily discount the predicted gains. We will not, however, look for trouble, but hope for the good fortune of fulfilment. In the direction at least of the aspirations of our craftsmen and labouring classes being enabled to enjoy a brighter standard of living, we are all in complete sympathy. Better homes, better surroundings, better education, and more elbow-room are necessary to our national development; and as matters are tending in respect of higher values for services rendered, the families of our artisans and

other workers will be able to afford homes with more of the conveniences and comforts of life in them. This is as things should be. It means a healthier and more contented people. The new houses that are to be constructed will certainly be much sought after. Those who remain in the older types of houses will only do so because they cannot get the new; but the knowledge of what those who tenant the new enjoy will only create a desire which must lead to the conversion and better equipment of houses that already exist. Otherwise, "To Let" boards will in time become conspicuous in our midst.

Reams upon reams of paper have been covered with schemes, advice, and all sorts of information as to what ought to be done in connection with the design, structural work, and fitting-up of appropriate new houses. In much of this our interest is only general. We link-up with the schemes through the ability of gas to raise the standard of conveniences, mitigate labour in the houses, and, by the co-operation of the architect, save much of the heavy chimney work, which occupies space and contributes to ugliness, and the place of which can be taken by simple waste-gas flues and ventilating-shafts. The British Commercial Gas Association are keenly alive to the possibilities of these housing schemes; and they realize their value in carrying the use of gas as fuel into a vast region where it has hitherto only been used, through the prepayment meter, for lighting and as fuel in the gas-cooker. Our manufacturers of gas-using appliances are running a neck-to-neck race with the Association in their endeavours in this connection. They are providing suitable apparatus and plans. Our columns last week bore testimony as to this. They have designed, and are still designing, suitable apparatus for the new housing schemes. They have found out that anything will not do. There must be suitability and applicability. Convenience, economy, and facilities for assuring cleanliness (where the will exists) have to be considered from the consumers' side; and ease of installation and maintenance has to be provided for from the landlord's side, or that of the gas suppliers if they are responsible for the appliances.

Take the article which was contributed to our columns last week by the Richmond Gas Stove and Meter Company. The cooker which they suggest should be provided in such schemes should be one furnished with legs to raise it from the floor, so that cleanliness is assured beneath the oven. For convenience and to preserve the surroundings of the cooker, a plate-rack with enamelled back-plate to prevent the wall being splashed is also recommended. There is no novelty in these things; but they are essentials to labour-saving and cleanliness. Then in addition to a parlour fire, points should be run to the bed-room fireplaces while the houses are being built. The gas-fires should also have boiler-rings upon them. This reminds that greater efficiency is needed than is obtained on the hot-plates of gas-cookers; our manufacturers are working in this direction. The convenience in the new houses of a hot-water supply, provided by gas-heated appliances, will save labour, and be very popular. Our intelligent artizan well knows that a higher standard of living is not to be obtained without cost. The article referred to shows how convenient hot-water systems can be installed with economy. While on this subject the attention of readers may be directed to Parkinson's new water-heater, which has been specially designed for small-class property. By the one appliance small quantities of hot water can be obtained in a very few minutes, or larger quantities of lower temperature water at will. This was also described in last week's issue. The article by the Richmond Stove Company includes figures as to running costs, based upon actual use in small houses; and these should be valuable to gas engineers who are investigating this subject with a view to local developments.

There is one thing quite certain, that haphazard installation will not pay in these new housing schemes. The whole matter must be studied from several points of view. Locality and the character of possible tenants will influence the plan of installation and type of apparatus installed. On all these points the articles that appeared last week will be suggestive. There is a permanent opening here for large expansion; and the permanence and extent must be considered in relation to the expenditure involved. The prepayment meter and the gas-cooker have paved the way to development; and the enlarged consumption of gas through prepayment meters during the war has clearly shown that in working-class houses there is no hesitation to pay reasonably for convenience.

Gas Workers' Hours.

There has been no settlement yet regarding the application for a forty-four hour week for gas workers. The matter was again under discussion at the Ministry of Labour last week, between Sub-Committees representing the men's unions and the gas industry. It is understood both sides are making a report with the view to further negotiations.

Ways and Communications.

The Government are confronted with such a mass of objections to the gigantically empowered Ministry which it is proposed shall take under its wing railways, light railways, canals, roads, tramways, and electric power undertakings, that they have thought it prudent to defer proceeding with the measure until next week. The industrial community generally, and the road and electric-supply interests in particular, are keenly antagonistic. Evidently the Government desire to take a proper measure of the opposition they will have to meet before deciding whether to go forward according to plan, or to lop-off some of the branches of the remarkable scheme.

The American Gas Industry in War Time.

Many of our readers will remember Mr. J. Arnold Norcross, who, for some considerable period, was with Messrs. Humphreys and Glasgow in this country. Knowing him, they will take a special interest in the Presidential Address which he recently delivered to the New England Association of Gas Engineers, and which we reproduce in this issue. It is a graphic account of war-time experiences in America; and the lessons of that time are applied to the future. The experiences were largely a reproduction of what we have had in this country in respect of coal, oil, labour, and excessive costs of materials. But the experiences were not quite the same. Some of the difficulties were quickly eased. Bad as the position of many gas-works became in regard to coal and oil stocks, the United States Fuel Administration soon organized systematic distribution; and before the end of the year gas-works in New England had, with few exceptions, a normal stock of coal and oil with which to meet the winter's demands. "Normal!" We have to look far back for the time when this was the condition here. Moreover, the New England Public Utility Commissioners appreciated the fact that good service depends on adequate means, and that a public service corporation without financial credit is not merely a disappointment to the stockholders, but a menace to the community. The British Parliament might with much advantage to the gas industry utilize the Commissioners as an example. But as to the lessons. Mr. Norcross is convinced that gas-works must in future be better prepared for emergencies by sufficient stocks, stores, and producing capacity. There should be two strings to the bow, by having coal and water gas plant, though Mr. Norcross is of opinion—remember an American is speaking who is in closer touch with oil conditions than we are here—that the price of oil must continue high. Bye-products, too, must be worked-up to produce the last dollar. He speaks of the steaming of retort-charges, and of much else that is pertinent to the present and future, and much that is wise.

Coal Commission and Prices and Profits.

The coal miners have done a public service in bringing about the investigation into the financial and other conditions of the coal industry. This can be said without agreeing that the demands of the Miners' Federation are either politic or justified. Their action, however, has put coal control into the balance, and, in regard to the price, it has been found wanting; and the Government itself will not come out of the inquiry with altogether clean hands so far as profits go. The fact is proved by Mr. A. L. Dickinson, Chartered Accountant, of Messrs. Price, Waterhouse, & Co., that the profit per ton of coal last year, up to September, averaged 3s. 6½d. per ton, or, in round figures, a total of £39,000,000, against the average of five years to 1913 of 1s. 1d. per ton, or in the total approximately £13,000,000. The difference, to again use round figures, is £25,000,000. The coal owners are only entitled to pre-war profits and 5 p.ct. of the excess profit. So that of the £25,000,000, there was only due to them £1,250,000. Of the £25,000,000, the Chancellor of the Exchequer takes £15,000,000; and £10,000,000 is retained by the Coal Controller. Now

Mr. Dickinson says until four months ago the Coal Controller had no knowledge as to what were the pre-war profits; and the further confession is made that, had the data been in their possession that are now there, the 2s. 6d. per ton increase in June last would not have been made. Surely, however, the Department must have had some data upon which to proceed, or they could not have estimated their requirements under the Coal Mines Control Act, and surely, too, they must have had some idea as to the harvest that was going to be reaped by the Treasury. With coal at the price it is, the country cannot look upon these financial proceedings without some feelings of indignation—more particularly as the Government well knew how heavily fuel prices were pressing upon industries. The average price of coal at the pit head in 1913 was 8s. 9d. per ton; up to September, 1918, it was 24s. 10d.! This must have been known, as well as the fact that America is competing for export trade with more energy than it has done before. In the case of the gas industry, the 2s. 6d. per ton represents an average of about 2½d. per 1000 c.ft. sold; and this 2½d. would have meant much to a considerable body of gas stockholders who are the victims of gross injustice on the part of Parliament. The Inland Revenue are busy calculating for the Commissioners the exact amount by which the Treasury has benefited by the excessive charges for coal.

Miners' Demands and Industry.

But it is pretty clear that the coal miners have no substantial claim to further participation in the profits, either by an advance of wages or by a further reduction of hours. The coal consumers supply the right destination for all profits in excess of working charges and the dividend to which the coal owners are entitled with the costs of distribution and a fair profit to the dealers. Coal consumers should receive the benefit by way of a reduction of price. Mr. Dickinson estimates that the claim to a six-hour day would mean a reduction of 20 p.ct. in output; and to compensate for the lessened output, an increased cost would be incurred of 2s. 7d. per ton above the September, 1918, figures. The increase in wages now sought would represent an additional 4s. per ton—making together 6s. 7d. per ton. Some authorities quote the total increase as 8s. 2d. per ton. The country and its industries cannot stand this, as was indicated by Mr. Benjamin Talbot, representing the National Federation of Iron and Steel Manufacturers, when he said that there would be a very injurious effect upon the exports of iron and steel. When the Government subsidy is removed next month, the manufacturers will be paying for blast-furnace coke upwards of 39s. per ton at the ovens, against the United States price of 18s. to 20s. per ton. Here Mr. Talbot put his finger on one of the causes of our producing costs for iron and steel being so much higher than those of America. As it takes 25 to 35 cwt. of coke to make a ton of pig iron, the augmentation of the difference in cost must mean grave injury—if not ruin—to the home trade.

Miscellaneous Points.

Two or three other points. One witness stated that it was estimated that the Coal Controller's transport scheme had saved the country £2,650,000. We have not seen any reflection of this in the gas industry; but the ill-effects of inferior coal have been felt on the grand scale. Mr. Frank Pick, of the Coal Controller's Department, who has become well known to many men in the gas industry through his work in connection with the Fuel and Lighting Rationing Order, mentioned in his evidence that the shortage of fuel anticipated in connection with rationing was 25 p.ct., but it had actually reached 33 p.ct. The position, however, is improving; and the present shortage is not more than 15 p.ct. He spoke, however, of the lowness of current stocks in London; and another interesting figure is that he calculates the cost of rationing to average about 6d. per ton. Upon this the question naturally arises, has the result justified such a cost? There will be doubts. Coal carbonization for the production of liquid fuel had an incidental reference when Mr. Walter St. D. Jenkins, the Deputy-Director of Naval Contracts at the Admiralty, was giving evidence. Mr. Robert Smillie seemed to think that, with developments of coal carbonization, sufficient oil fuel could be obtained for the Navy from coal and shale; but Mr. Jenkins intimated that he thought Mr. Smillie was inclined to exaggerate the amount that could be realized from this source. Of course, Mr. Jenkins is right, and Mr. Smillie wrong. A large contribution can be made through coal carbonization; but the needs of the Navy are enormous.

Standard Benzol.

An article has been contributed to "Motor," criticizing the standard specification of the National Benzol Association, which we published on Feb. 18 [p. 322]. Regarding the distillation test, the writer thinks the percentages and temperatures are all too generous to the producer. He would sooner see a higher percentage "over" at 100° C.; and the "dry" point would be safer from motoring considerations if the "tail" were shortened. The "dry" temperature of 125° C. is getting near to allowing the presence of the next constituent, xylol, which is not wanted. As to sulphur impurities—carbon bisulphide and thiophene—the percentage allowed, 0·4 p.ct., is equivalent to about 280 grains per gallon; and tests which the author has made indicate (though he does not present the results as conclusive) the desirability of keeping the percentage lower than 250 grains per gallon, in order to be positively safe. As to the rectification test, everything depends upon the personal interpretation of the expression "a light brown colour." It is also considered essential that all polymerizable bodies should be washed-out of the spirit, to avoid deposits on the valve-stems and the trouble of stuck-up valves.

Benzol Distribution.

As announced in our last issue, the National Benzol Association have decided to form a Distributing Company, so as to overcome difficulties in this respect. The Automobile Association are taking a very practical part in ensuring distribution at home, and so helping to prevent export through the non-existence at the moment of the necessary distribution equipment. They are arranging for the delivery from the nearest supplier, through an agent, to their members. Drums are the supreme difficulty. The "A.A." show enthusiasm in a circularized statement, which is characteristic of Major Stenson Cooke. This is a sample paragraph: "Buy British benzol always through your local 'A.A.' agent and repairer. We can help you—we will help him. Buy benzol in 50-gallon drums, and keep it in your garden or outhouse, 20 ft. from a dwelling-place. The regulations are not difficult to comply with. We will give you the fullest advice and help. Alternatively, get the local 'A.A.' agent to store it for you. Drums are difficult to get; we have provided for that. We have secured a large supply of 50-gallon steel drums, one or more of which you can hire at a purely nominal fee of 10s. a year."

Proceedings of District Associations.

Announcement has been made in another section of the "JOURNAL" of the fact that there has now been completed the thirty-sixth volume of the series of "Reports of Proceedings of the District Associations of Gas Managers"—the period covered being the year 1918. It was still a "war-time period"—although 1918 will always be memorable for having witnessed the end of the actual fighting—and novel problems and unprecedented difficulties were the lot of the gas managers; but since 1914 a wealth of new experience has been gained, much of which has been discussed at meetings of the technical societies connected with the industry. Among this experience is doubtless to be found a great deal which will be useful in time to come. Taking everything into consideration, the past year was, from the Association point of view, a fairly active one; and the record of what transpired at the gatherings of the ten organizations included in the volume occupies some four hundred pages. Naturally, something has had to be added to the price. With growing costs in all directions, this was inevitable; but the increase has been kept within the lowest practicable limits.

The tenth anniversary dinner of the Illuminating Engineering Society—postponed from the 11th ult.—will be held on Tuesday next at the Trocadero Restaurant, Piccadilly.

An Order has been made by the Local Government Board, under which the Oldbury Urban District Council will have a calorific standard of 500 B.Th.U. in place of the illuminating power standard to which they have previously worked.

At a meeting in the Council House, Birmingham, next Thursday evening, of the Midland Junior Gas Association, Mr. E. W. Smith, D.Sc., F.I.C., the Chief Chemist to the Birmingham Corporation Gas Department, will give a lecture on "Gas Quality." The time is 6.15.

The March issue of the "Co-Partnership Journal of the South Metropolitan Gas Company" mentions, in connection with the "War Fund," that on the 22nd ult., which ended the 238th week, payments were made to 1005 adults and 1938 children, amounting to £448. This made the total paid £122,805. On the day named 2140 of the Company's men were still serving with the Colours, and about 800 had returned to work since the armistice.

THE NEW COAL CONTROLLER.

At the request of the Government, Sir Evan Jones, Bart., M.P., has consented to accept the appointment of Controller of Coal Mines, in succession to the late Sir Guy Calthrop. Sir Evan Jones, who will be remembered as the Petrol Controller, was the speaker who followed Mr. D. Milne Watson at the benzol industry luncheon reported in last week's "Journal" [p. 442].

Sir Richard Redmayne and Mr. A. Lowes Dickinson will continue to act as the principal technical and financial advisers to the Controller, and Mr. F. Pick will still deal with the distribution of household fuel. Mr. W. A. Lee will continue as Secretary of the Department, and will as hitherto take up questions of export and prices.

THE INSTITUTION ANNUAL MEETING.

An intimation regarding the provisional programme for the annual general meeting of the Institution of Gas Engineers—to be held in London, on Tuesday, Wednesday, and Thursday, May 27, 28, and 29, under the presidency of Mr. Samuel Glover, of St. Helens—has been issued to the members by the Secretary (Mr. Walter T. Dunn).

On the opening day, there will be the preliminary business, including the appointment of Scrutineers for the election of officers and members; the reception of guests from abroad; the President's Address; the annual report of the Council; and the report of the Gas Investigation Committee. In the evening, the members and ladies are to be invited to a reception and dance by the President and Mrs. Glover.

Wednesday will open with the annual general meeting of contributors to the Benevolent Fund, after which the meeting of the Institution will be resumed. There will be the reports of the Refractory Materials Research Committee and of the Life of Gas-Meters Research Committee, and the reading and discussion of papers.

The consideration of papers will be resumed on the Thursday. There will also be replies to question papers; the Scrutineers' report of the ballot; the election of honorary members; and concluding business.

With the object of increasing interest in the work of the Institution, the Council have decided to issue to each member a question-paper, giving facilities for calling attention to any subject members may be particularly interested in, and on which they desire to ask a question or questions of the President and Council. These papers [which were enclosed with the circular] must be returned so as to reach Mr. Dunn not later than May 3.

Several interesting communications have been accepted for reading and discussion; and the Council will be pleased to receive other offers at an early date, with a view to the completion of the programme.

A ballot for new members will be taken at the meeting. Forms of proposal for the use of those desiring to be elected to membership are obtainable at the offices, and should be returned without delay for submitting to the Council. Invitations to attend the meeting will be issued to accepted candidates.

An intimation has been received that the Société Technique de l'Industrie du Gaz en France propose to organize a special reception of the Gas Associations of the allied countries, to take place at Paris in the coming autumn. Particulars of the arrangements will be issued to members of the Institution in due course.

The Committee of Management of the Benevolent Fund desire Mr. Dunn to call attention to the good work which is being done by means of the fund, in affording relief to those associated with the Institution who are in need of help. Last year, fifteen cases were assisted, after careful consideration had been given to the circumstances of each; but the income, apart from donations, was not sufficient to provide for the grants made. New subscribers are therefore urgently needed.

PERSONAL.

Among the names of officers mentioned in despatches by General Allenby, commanding the Egyptian Expeditionary Force, is that of Captain (Acting Major) A. H. Jolliffe, O.B.E., R.E. Captain Jolliffe is the elder son of Mr. and Mrs. J. T. Jolliffe, of Ipswich. He was educated at Ipswich School, and subsequently on the "Conway" mercantile marine training ship, whence he passed into the service of the Clan Line, with whom he spent some years. In the early part of the war, on returning from South Africa, he was given a commission in the Inland Water Transport Service, Royal Engineers, and took an active part in the construction and equipment of the new port of Richborough, upon the completion of which he was transferred to Egypt.

Mr. Ralph Halkett, Assistant General Manager to the Glasgow Corporation Gas Department (who has been placed in charge of the undertaking during the absence owing to eye trouble of Mr. Alexander Wilson), is to succeed Mr. Hanbury Thomas as General Manager to the Sheffield Gas Company. After spending some time in the Distribution Department of the Leeds Corporation, he went to Glasgow nearly seven years ago as Commercial Superintendent, and in 1917 became Assistant General Manager. He will remove to Sheffield on Mr. Wilson's return to duty.

Mr. S. E. Whitehead, B.Sc. (Eng.) Lond., F.C.S., has been appointed Assistant Engineer and Chief Draughtsman to the Portsea Island Gas Company. After six years on the technical staff of the Birmingham Corporation Gas Department, he went to Southport under Mr. John Bond, in conjunction with whom he carried out some important research work for the High Explosives Committee. As a result of this, Mr. Whitehead was offered the post of Chief Assistant to Mr. W. Doig Gibb, in the Department of Explosives Supply. This position he has occupied for a little over three years; and he has also been Supervising Engineer of the Benzol and Toluol Sub-Section.

After having been for sixteen years Manager of the Tiverton Corporation Gas-Works, Mr. Clark Jeffery has resigned, in order to set up an ironmongery, gas-fitting, &c., business in the town with his two sons, who are at present in the army. He will also take up consulting practice for gas undertakings, thus making use of the experience he has gained in the 35 years he has spent in various gas-works.

Captain Harold E. Bennet, M.C., the second son of the late Mr. John H. Bennet, has been elected a Director of Messrs. Alder & Mackay, Ltd., of which Company his father was Managing Director.

It was pointed out at the meeting of the East Grinstead Gas and Water Company that both Mr. P. E. Wallis (the Chairman) and Mr. D. T. Livesey (the Secretary and Manager) were that day celebrating the "Silver Anniversary" of their connection with the Company; and a proposal was heartily approved by those present that a sum of fifty guineas be placed at the disposal of the Directors to purchase two gifts and provide illuminated addresses for Mr. Wallis and Mr. Livesey, as mementoes of the interesting event, and in appreciation of their valuable services. Twenty-five years ago Mr. Livesey became Manager, and now he has succeeded the late Mr. E. A. Head as Secretary also.

OBITUARY.

Mr. Samuel Cross, the father of Mr. F. W. Cross, of Lea Bridge, passed away last Wednesday morning at a ripe age, for he would have been 87 years old on the 15th of this month. While apparently of full strength for such an age, he had a slight stroke on Saturday, the 8th ult.; and though he physically recovered from the effects of this seizure, it was sufficient to undermine his strength, and he gradually faded away to a peaceful ending. He was appointed Manager of the Abergavenny Gas-Works in 1865, and led an active life until his retirement in October, 1903, after the death of his wife in 1902, and his youngest son in July, 1903. He was then appointed Consulting Engineer to the Abergavenny Corporation Gas-Works, and continued to take an interest in the undertaking right up to the last. He was a very enthusiastic Freemason (being the Father of the "St. John's" Lodge of Abergavenny), and was held in the highest respect and esteem by his fellow-townsmen.

The death occurred at Bath, on the 24th ult., of Colonel James Le Geyt Daniell, Hon. Colonel and late Commanding 4th Battalion East Surrey Regiment. Deceased, who was in his 88th year, was for a long period connected with the administration of both the Malta and Mediterranean Gas Company, Ltd., and the Ottoman Gas Company, Ltd. Of the former Company, he was elected an Auditor in 1861, a Director in 1884, and was Chairman from 1900 until 1917. He retained his seat on the Board until the time of his death. He was appointed a Director of the Ottoman Gas Company in 1894, and Chairman in 1897. But in 1916 he resigned both the chairmanship and his seat on the Board.

British Industries Fair.

The British Industries Fair, 1919, has come and gone; and, from observations during a visit on the last but one of the eleven days on which it remained open, the statement seems justified that, from the point of view both of numbers of visitors and scope of the exhibits, this year's display was a marked improvement on its predecessors. As was the case twelve months ago, the Fair was arranged on the Pennington Street premises of the London Docks, where there is room for it to spread itself out; and it was confined to the same trades as before. One of these was glass; and it was noticed that, in addition to some British-made lighting glass (fourteen makers of which were represented), there was a very good display of laboratory glassware (twenty-six manufacturers being represented), a quantity of glass rod and tube, and some laboratory porcelain. In the paper, printing, and stationery section, the Aerograph Company, Ltd., showed their spraying equipments.

Next Saturday, there is to be a joint visit of members of the Eastern and Western Districts of the Scottish Junior Gas Association to the Stirling Gas-Works. After the inspection, the Gas Company will entertain the visitors at tea.

THE SOUTH SUBURBAN GAS COMPANY'S WAR MEMORIAL.

IT may be remembered that Mr. Charles Hunt, M.Inst.C.E., at the recent half-yearly meeting of the proprietors of the South Suburban Gas Company, stated that a memorial is to be erected in front of the Livesey Hall at Lower Sydenham to commemorate the services rendered in the war by 459 of the Company's employees. The cost of doing this is to be contributed to by the Company, the Directors, and employees of all grades.

The chief feature of the monument, as will be seen from the photographic reproduction of the artist's sketch model, is a bronze figure of Victory triumphing over evil, as typified by a serpent entwined round the base forming the pedestal. On the two bronze panels in front will be placed a dedicatory inscription, and the names of those who have fallen in the war; while the names of all the Company's employees who have served in His Majesty's Forces will be inscribed on a bronze tablet at the back of the memorial. The body of the work will be in Portland stone and the total height of the monument will be about 12 ft. 6 in.

Mr. Sydney March, of Farnborough, has designed the memorial and will carry the work into execution.

Canadian Gas Association.

Mention was made at the time of the different papers, &c., presented at the eleventh annual convention of the Canadian Gas Association, which was held at Montreal last August; and now these have been reprinted in book form, of a size small enough to slip into the pocket. The frontispiece is a portrait of Mr. C. C. Folger, the President for 1918-19; and a list of members is followed by photographs of the Vice-Presidents (Messrs. V. S. M'Intyre and C. S. Bagg), the Secretary-Treasurer (Mr. George W. Allen, of Toronto), and other officers. There were seven papers read; and one of them, on the "Calorific Standard for Manufactured Gas in Canada," by Mr. Arthur Hewitt, the General Manager of the Toronto Consumers' Gas Company, was reproduced in full in the "JOURNAL" for Oct. 15 last. In another of the contributions, Mr. G. W. Allen considers the "Possibilities Ahead of the Gas Industry;" while a third, on the "Development of the Industrial Gas Field," by Mr. Charles D. Slimpin, of Montreal, is accompanied by over thirty illustrations of industrial gas heating and cooking installations.

Midland Association of Gas Engineers and Managers.—The forty-first annual report of the Committee and statement of accounts will be submitted at the annual meeting of the Association on Thursday. The new President (Mr. A. T. Harris, of Market Harborough) will deliver his Inaugural Address; and there will be discussions on the papers read at the last meeting by Mr. H. A Copp and Mr. W. A. Twine [see "JOURNAL" for Nov. 5]. The meeting will be held in the Grand Hotel, Birmingham, at 2.30; and at the conclusion of the business, members are invited to take tea with Mr. Harris.

NATIONAL GAS COUNCIL OF GREAT BRITAIN AND IRELAND.

District Representatives.

AT a meeting of the re-formed Manchester District Executive Board held at the Town Hall, Manchester, last Friday, the following appointments were made:

LANCASHIRE SECTION.

DISTRICT EXECUTIVE BOARD.

Alderman WM. KAY, J.P., Manchester, Chairman.
Alderman F. S. PHILLIPS, J.P., Salford, Vice-Chairman.
Mr. J. H. SILLITOE, Manchester, Secretary.

REPRESENTATIVES ON CENTRAL EXECUTIVE BOARD.

Preston.	Birkenhead.
Heywood.	Runcorn.

MANAGEMENT COMMITTEE.

Liverpool.	Rochdale.
Preston.	Heywood.
Radcliffe.	Birkenhead.
Bolton.	Chester.
Stockport.	Runcorn.
Burnley.	Colwyn Bay.

SEPARATE COMMITTEE OF EMPLOYERS.

Alderman F. S. PHILLIPS, J.P., Salford, Chairman.
Alderman WM. KAY, J.P., Manchester, Vice-Chairman.
J. H. SILLITOE, Manchester, Secretary.

REPRESENTATIVES ON CENTRAL COMMITTEE OF EMPLOYERS.

Manchester.	Salford.
Liverpool.	Heywood.

MANAGEMENT COMMITTEE.

Liverpool.	Radcliffe.
Heywood.	Stockport.
Preston.	Birkenhead.
Bolton.	Chester.
Rochdale.	Runcorn.
Burnley.	Colwyn Bay.

A meeting of the Yorkshire Section took place yesterday in the Lord Mayor's Parlour, Bradford; and the following appointments were made:

YORKSHIRE SECTION.

DISTRICT EXECUTIVE BOARD.

Mr. CHARLES WOOD, Bradford, Chairman.
Mr. H. TOWNSEND, Wakefield, Vice-Chairman.
Mr. HAROLD DAVIES, Brighouse, Secretary.

REPRESENTATIVES ON CENTRAL EXECUTIVE BOARD.

Sheffield.	Bradford.
York.	Ossett.

MANAGEMENT COMMITTEE.

Doncaster.	Heckmondwike.
Halifax.	Leeds.
Keighley.	Mirfield.
Ossett.	Normanton.
Wombwell.	Sheffield.
Harrogate.	York.

SEPARATE COMMITTEE OF EMPLOYERS.

Mr. CHARLES WOOD, Bradford, Chairman.
Mr. H. TOWNSEND, Wakefield, Vice-Chairman.
Mr. HAROLD DAVIES, Brighouse, Secretary.

REPRESENTATIVES ON CENTRAL COMMITTEE OF EMPLOYERS.

Sheffield.	Bradford.
York.	Ossett.

MANAGEMENT COMMITTEE.

Doncaster.	Heckmondwike.
Halifax.	Leeds.
Keighley.	Mirfield.
Ossett.	Normanton.
Wombwell.	Sheffield.
Harrogate.	York.

The names of the representatives of the various undertakings mentioned above will be announced later.

The Board of Trade announce that, arrangements having been completed for the merging of the duties of the Coal Exports Committee with those of the Coal Controller, the Coal Exports Committee is dissolved as from last Saturday. Applications for licences (which may continue to be made on the existing forms), and all correspondence, should accordingly be addressed to the Coal Mines Department (Export Branch), Holborn Viaduct Hotel, London, E.C.

ELECTRICITY SUPPLY MEMORANDA.

Time was when the electricity supply industry could not say hard enough things about the Board of Trade. The Whitehall Department had, according to electrical writing, always been a ponderous impediment to the progress which the inherent merits of electricity should, by all accounts, have assured, but were not of themselves (so events have shown) a sufficient force to cut through bureaucratic stupidity. Now that the Government are going to couple-up electricity to the brand-new Ministry of Ways and Communications, there are electricity supply authorities who are passing resolutions protesting against the removal of the industry from the ægis of the Board of Trade. Their view is that it is better to bear the ills of which they have, by long experience, been able to take measure than have others imposed on them which may be immeasurably worse. Those who are passing these resolutions are doing so without the slightest proof. Fear alone impels their new action, which is a complete change of front, and a compliment that the Board of Trade will highly appreciate after the unfriendly mauling to which they have been electrically subjected in the past. However, the electricity industry seems as much in the dark as other people as to what is to be its actual fate. In addition to the forcible linking-up with the Ministry of Ways and Communications, there is to be a Bill which is under preparation by the Board of Trade. Some people think that this will propose the nationalization of the industry; but the Government appear to be rather shaky on nationalization just at the present time, despite the mollifying things that have been said in the presence of the hatchers of political plots in this direction—the miners and the railwaymen. One thing is certain, that the sovereign object of the Board of Trade Bill will be the cheapening of electrical generation. But from every point of the compass comes the electrical query, "Will it?" Meanwhile, the electrical authorities of different classes—company, municipal authority, power company, and district council—are girding-up their loins, and preparing for meeting whatever may come to them from out of the legislative darkness. The Chairman of the London Electric Supply Corporation said the other day that the London electricity companies were jointly acting together in support of the interests of their shareholders; and Mr. Walter Leaf, the Chairman of the St. James' and Pall Mall Company, has stated that the companies are going to take a very determined attitude in defence of the right to full compensation to which they are entitled. The London companies are in constant conference over the difficult task of determining exactly what are the terms which they are prepared to require if it is decided that they are to be expropriated. They are also considering the possibility of putting forward some joint scheme under which they may be permitted to co-operate in the future supply of London.

Obscurity and Preparation.

A Contrast in Dividends.

A great deal of uncertainty may exist as to the future of the electric supply companies; but in these times, when gas proprietors are groaning over the action of a sliding-scale which makes no provision for exceptional occurences, but leaves them to the tender mercy of any turbulence raised by outside forces, there is a little envy regarding the liberty of electricity companies in the matter of dividends, and the plump ones which some of them are paying. The dividend warrants of the Metropolitan gas companies have been distributed, handing the stockholders £2 2s. for every £100 invested—that is to say, 3 p.ct. under the Relief Act, less 6s. in the pound, a moderate part of which will be allowed back by a merciful Government to those who are not overburdened with wealth. Some gas stockholders are getting even less than that. We see, on the other hand, that the St. James' and Pall Mall Electric Light Company are paying 10 p.ct. for the past year, against 9 p.ct. the previous year. The Westminster Electric Supply Corporation are paying 9 p.ct. for the past half year, making 8 p.ct. for the year. We congratulate them, while regretting that the operation of the sliding-scale was not suspended on terms more favourable to investors in gas stock.

The Development Association.

More information has been published regarding the new Electrical Development Association, which is an offspring of the Institution of Electrical Engineers, but is now independent, other than that it is to derive sustenance from the various bodies associated with the electricity supply industry—apparently the manufacturers of electrical appliances being in the van of contributors. The first object of the Association is to educate the public in the widest possible use of electricity. In the educational work, we have not the slightest doubt there will be omissions. For example, the public will not be informed—through the Association—of the low thermal efficiency of electricity in respect of the use of coal at the generating stations; nor will the public be told of the low values in relation to other agents put into their possession by electricity for both cooking and heating. Confident are we that the funds of the Association will not be utilized in circulating among the public Prof. Cobb's recent article in the "Edinburgh Review." A technical information department is to be established with the view to removing obstacles to the more general use of electricity for domestic purposes. The Association are proposing to enter upon their work at an early date; and with this object they have advertised for applications from "electrical engineers" of British birth for the position of director, at a commencing salary of £1000 a year. The applicants must have had wide experience, and be the owners of good organizing ability. The advertisement does not add other necessary qualifications, such as that the man who enters upon this office must be truthful, sure of his "facts," and with an epidermis of good resisting qualities.

Electrical Equipment for the Housing Schemes.

The activities of the British Commercial Gas Association in connection with housing schemes are not commending themselves to our electrical friends. To a very general feeling pervading the electrical industry, expression is given by Mr. R. Hardie, the Manager of the Electric Show-Rooms of the Glasgow Corporation, in a letter to the "Electrical Review;" and our contemporary supports him in his complaint. He does not appear to find activity going on in the electricity industry equal to that in the gas industry. The simple reason for this is that the electrical industry has not the same value to offer as the gas industry. Mr. Hardie, with some candour, acknowledges this, when he says: "It is obvious that if gas equipment becomes standard practice (as it threatens at this juncture), we shall have a hard job displacing it later, or even getting a share of new business. Surely, now is the time to attempt through combined action on the part of manufacturers of electrical apparatus and supply authorities to obtain an electrical cooking and heating equipment which could be offered on competitive lines for installation in these new houses. Otherwise our appeal is likely to remain confined to the Rolls-Royce section of the community." "Competitive lines" include more than the offer of an equipment. Is the equipment for cooking, heating, and hot-water supply which the electricity industry can offer for these housing schemes less in initial cost than gas appliances? Are the expenses of installation less? Will the maintenance costs be less? Will the running expenses be lower? Will they save as much time as the gas appliances? Mr. Hardie will have no difficulty in answering these questions in the negative. Only last summer he wrote to the "Electrical Times," stating that electrical equipment easily cost twice as much as gas equipment; and he said that what electrical men were warranted in asking for was a much-needed improvement in this respect to enable them to wage the fight on more equal terms with gas.

Lighting in Small Houses.

The "Electrical Review" pats Mr. Hardie on the back, and proceeds to run-down gas as a lighting agent. Or rather it does so by adopting something written by someone else in a report. It does not tackle the matter off its own bat; and this is the benevolent "Review" which recently wrote: "Electricity used to be looked upon in the early days as a bitter rival of gas; but the progress of time and science has shown that they are not only not rivals, but interdependent, and equally important to the community." Now it grasps with avidity and something of relief a report prepared by a Committee appointed by the President of the Local Government Board and the Secretary for Scotland to consider questions of building construction in connection with the provision of dwellings for the working classes of England, Wales, and Scotland. Experience during the war has shown that some of these reports have been prepared by men who are biassed, or who have obviously no exact scientific knowledge. What the Committee says is very sensibly, if not courageously, quoted without comment by the "Review." Here are the Committee's observations:

> The popularity of electric lighting in cottage dwellings is undoubted. Not only does it save considerable expense in whitewashing ceilings, re-decorating walls, &c., but it has a much more important advantage, as compared with gas, in that this light consumes no oxygen, and does not vitiate the air. We have already seen how difficult it is in cottage dwellings to secure the minimum amount of air space per person which the medical authorities regard as desirable. Therefore, it is an important argument in favour of electric lighting, that it may be safely said that, in order that a room lighted by gas may be as healthy to live in as one lighted by electricity, it should contain additional cubic air space, unless some special and effective form of outlet ventilation be installed to carry off at the ceiling level the vitiated air as fast as it is formed. In deciding between the two methods where an alternative is available, this advantage in connection with electric lighting should be considered.

There is nothing much to be said regarding this little commonplace statement. Practical experience is sufficiently destructive. The "popularity" of electric lighting in cottage dwellings is not undoubted. The wonderful position of the prepayment meter in connection with gas supply compared with the fragmentary "popularity" of the prepayment meter in electricity supply attests this. We know of cases where electric lighting in small property has been displaced by incandescent gas lighting. Mr. Fedden, of Sheffield, has reported upon experiences in that industrial area and other electrical engineers know full well, although they will not advertise the fact, that the small householder is prone to drift back to gas lighting if he is not tied to electric lighting through the absence of gas-pipes. The small householder knows that he gets more light of better quality for his money from incandescent

gas-burners, especially of the inverted type, than from electric lamps. In these years of daylight saving, not much artificial light is required in summer time; and in the cold months of winter the incandescent burner is a welcome contributor of heat, and will be more so with more costly solid fuel. The point as to the consumption of oxygen is about as trivial as anything could be. The incandescent burner consuming 2½ c.ft. per hour will give a 50 c.p. light; but with flat-flame burners we should have had to consume about 20 c.ft. of gas to get the same amount of light. Compared with the 2½ c.ft. of gas, the coal fire draws upon the air supply at express speed; and while there is sufficient air in a room to support combustion, there is more than sufficient oxygen to maintain the full vitality of the individual. Nothing more childish than the reference in the report to the consumption of oxygen by gas could have been inserted. We should much like to see the defence of the "Electrical Review," and then discuss the matter with it. As to ventilation. The report acknowledges that the cubical capacity provided in the rooms of such dwellings is not large. Then in these new dwellings, let us have them as perfect as possible in this respect, by providing ventilating outlets at the upper parts of the rooms. Gas will assist, through the upward currents it sets up, in keeping the rooms well ventilated, which will be considerably healthier than the air stagnation in rooms when electrically lighted. We shall be glad to learn what the "Review" itself has to say on these matters, as well as its explanation of why it did not refer to the Committee's recommendations as to the use of gas for cooking and other domestic purposes, as referred to in our "Miscellaneous News" columns to-day.

THE BEARING OF PROF. V. B. LEWES'S WORK ON TO-DAY'S CARBONIZING DEVELOPMENTS.

By C. B. TULLY, of Kingscliffe, Northants.

IT is of particular interest at the present time to reflect upon what our old friend, the late Prof. Vivian B. Lewes, in his book on "Liquid and Gaseous Fuels," had to say about steaming retorts. There is a chapter on water gas in which he says it was during the latter half of the eighteenth century that the fact was discovered that when steam is passed through red-hot carbon an inflammable gas is produced. He further states it was not until 1824 that any attempt was made to adapt the action to commercial requirements. In that year, Mr. Ibbetson conceived the idea that the volume of illuminating gas could be largely increased by passing steam through the red-hot coke left in the retort after the carbonization of the coal had been completed—the gas so produced passing on and mingling with the coal gas.

The professor goes on to say that it was soon found that the temperature of the carbonaceous matter was too low; that the large quantities of carbon dioxide produced utterly ruined the illuminating power of the gas; and that, although Ibbetson's process has been patented many times over since that date, the same cause has always led (and must always lead) to failure. It is admitted that this argument applies to illuminating power; but CO_2 is equally detrimental to thermal efficiency. Not only has it no heating value, but it lowers the flame intensity, and consequently the mantle and heating efficiency.

The reason for this he states is that, at a high temperature, the action of the steam upon the carbon is to yield a mixture of equal volumes of carbon monoxide and hydrogen—both inflammable gases; while the action which decomposes the steam also rapidly reduces the temperature of the carbon the moment this falls below a certain point. If the quantity of steam be kept constant, carbon dioxide begins to appear in place of carbon monoxide; and as this is the most fatal of any known gas to the development of light in flames which owe their luminosity to the separation of carbon particles, its presence in any large quantity must, of necessity, ruin the quality of the coal gas with which it is mixed.

He further states that the value of water gas for all purposes depends upon the carbon dioxide being kept down to the lowest limits commercially possible. On p. 247 of the same work, he goes on to say that it is quite clear that the supply of gas of a high candle-power is simply waste of money; and it is manifestly unfair that the consumer of average intelligence, who is willing to utilize the benefits given by the incandescent mantle, should have to pay for a quality of gas only rendered necessary by the inertia of those who decline to march with the times.

Water gas, Prof. Lewes says, is the only gaseous product cheap enough, and sufficiently rich in calories, to use in admixture with coal gas as a combined heating and illuminating gas. He suggests that, instead of mixing the blue water gas with the coal gas, great advantage is to be gained by passing the gas into the foul main; and it is found that a distinct gain in candle-power is obtained owing to the water gas becoming, to a slight extent, carburetted with the benzol vapour present in the hot gas.

The most important use of the water gas, he points out, is when used for the dilution of coal gas, other than merely increasing the volume, in that, instead of using water gas solely as a diluent, it should be made a factor in the distillation itself by passing a stream of water gas through the crown of the retort during the process of carbonization, so as not only to hurry the newly-born hydrocarbon gases out of contact with the hot walls of the retort, but also by diluting them, to prevent the secondary reactions, which were so important a factor in the production of tar, from taking place, and by so doing save from destruction many of the important lighting and heating constituents.

The steaming of retorts for the production of water gas is economically bad, and has nothing whatever to recommend it. The best method to adopt is, as suggested by the professor, to pass good water gas into the retorts previously heated if possible to the highest temperature obtainable. A high-class water-gas plant will produce the cheapest B.Th.U. obtainable for the purpose, at the lowest possible capital outlay, and costing not more than 0·4d. per 1000 c.ft. for repairs and maintenance of plant.

This book by Prof. Lewes is full of valuable information of special interest at the present moment; and it also deals with the B.Th.U. of gases and flame temperature, and so should be in the library of everyone interested in the manufacture of gas.

POWER ECONOMIES IN GAS-WORKS.

By F. R. PARSONS.

IN the matter of power generation and distribution, gas-works provide as a rule outstanding examples of wastefulness and misapplied energy. In defence of such an uncompromising assertion, it has on more than one occasion been put to the present writer that this may, in great measure, be due to the fact that invariably power produced in gas-works is relatively cheap—this applying more particularly to steam power. The inference is, one supposes, that fuel, either solid or gaseous, is practically unlimited in quantity; and its use in conversion into power is not strictly accounted for as a tangible item in production costs. Be this as it may, it is undeniable that considerable economies could in this direction be effected, which must ultimately be of material advantage to all concerned.

Take, first, the losses in a steam-plant due to radiation—an uncovered boiler and steam-pipes. The rate of heat loss due to an uncovered boiler (which, by the way, one often sees in a gas-works) depends upon the difference between the temperature of the steam within the boiler and that of the outside air; also the degree of moisture present in the steam, and the thickness of plate. It may, however, be taken for granted that, under average conditions, condensation from this cause alone would be equivalent to from 1 to 1·5 lbs. of steam per square foot of uncovered boiler surface per hour.

This may not, by itself, sound extraordinarily serious; but let us see what it might in the aggregate really mean in a concrete example. Take, as an illustration, an uncovered Lancashire boiler, 21 ft. by 7 ft.—a not unusual size for a gas-works. This would have 126 sq. ft. of plate exposed throughout its length. Assuming a loss of (say) 1·5 lbs. of steam per sq. ft. of uncovered surface, we have a total loss of, roughly, 190 lbs. per hour. This—with fuel at the comparatively low figure of 15s. per ton, and assuming a total heat loss per year of 1½ million pounds of steam—would represent in money value an annual loss of not much short of £25. Or, to put it another way, assuming every 18 lbs. of steam lost is equivalent in value to 1 H.P.-hour, then we are every year wasting about 8000 H.P.-hours of useful energy.

Granted that no amount of covering would, it is anticipated, reduce this loss to absolute zero, it may be accepted that, under ordinary conditions of covering, such losses could be reduced to at the very least one-tenth.

Then take the number and length of uncovered steam-pipes running across a gas-works' yard, serving perhaps several tar and liquor pumps, or supplying engines for driving mechanical washer-scrubbers, for distilling purposes, sulphate plants, or for driving elevating or conveying machinery. Often these pipes may in wet weather without the slightest difficulty be traced from their source to their destination by the clouds of steam and vapour arising therefrom, due to their being uncovered and in no way protected. And the loss from this source would be considerably greater per square foot of uncovered surface than that of a boiler, because the variation in the respective temperatures would be so much greater.

Next take energy losses due to mechanical friction. Friction is a very useful quality in its place, but it is the greatest bugbear known to mechanical science when it is misplaced. Without friction, a locomotive could not be propelled a single inch, and (to use a paradox) even were it put in motion nothing but a solid obstacle set in its path would bring it to rest were there no such thing as friction. If friction did not exist, we could not live on this planet for a single minute—there would be no light, no sunshine, Nature's laws would have no meaning for us.

Of the total amount of energy supplied to an engine in reasonably good working order, about one-tenth is used in overcoming friction. But this is a minimum allowance, and would doubtless represent more than fair (certainly above average) conditions. Ordinarily, it is assumed that engines of the type running in gas-works, whether steam, gas, or oil, in operation the clock-round day in and day out, would not show a mechanical efficiency much above 50 p.ct.—half of its developed power being wasted in overcoming its own friction.

This would be brought about as a result of worn and badly fitting main-bearings, crank-shafts out of level or alignment, pistons and valves running dry, gland packings screwed-up

over-tight or allowed to get hard and dry, insufficient or ineffective lubrication, use of poor quality oils, or the engine running under a relatively light load.

Text-books tell us that friction is directly proportional to the load. Strictly, this does not so apply in the case of an engine. Thurston and other equally eminent authorities have made it quite clear that the friction of an engine is practically constant for all loads. Hence the power lost in running an engine under a light load is relatively much greater than if the engine was run consistently at its full load.

Mention has been made of the misuse of gland-packing, and the possibility of its being a very powerful contributory agent to friction losses. The writer can cite a case where a 35 H.P. high-speed steam-engine showed on a brake-test an increase of 7·8 H.P. merely by clearing the packing glands of old hard packing, and refilling with a new and improved type which required little or no nut-pressure to maintain perfect steam-tight conditions.

Because of the fact that shafting and power transmission devices are in a gas-works invariably subjected to the very worst kind of conditions—perhaps running in an atmosphere charged with coal or coke dust, or an atmosphere heavily impregnated with steam or acid fumes—the losses due to friction from these causes are apt to be considerably above normal expectations. Misalignment, wear, and lack of efficient or regular lubrication in shafting and bearings might easily be responsible for as much as 60 p.ct. loss; while in transmitted power-lines—driving elevating and conveying machinery, coke-handling plant, and so on, usually situated in the very worst of surroundings—the losses by friction alone due to wear and tear, want of oil, and proper care and attention, might even bring the percentage of useful work given out by the prime mover as low as 5 p.ct.—95 p.ct. of the total power output being absorbed in friction.

Losses due to belt-slip, or abnormal tension strains applied to belting in order to get it to deliver its load, are further prolific sources of friction loss. The harder and more neglected a belt becomes, the greater must be its working tension in order to recover its lost co-efficient. Hence the more tension applied, the greater is the pull on the bearings and the shafting; and friction increases *pro ratâ*.

Allowing machinery or machine tools to be driven empty for hours on end is another source of power loss. Leakages due to want of packing in pump-glands lowers considerably the mechanical efficiency of a pump, and thus produces loss. Exhausters, boosters, fans, and so on eat up any quantity of power beyond necessity, if permitted to get out of good running order, or the shafts and bearings become worn, the packing dry and hard, or the internal mechanism tarred or gummed up. Driving chains and sprockets, elevating and conveying buckets, skids, and joints, provide hundreds (nay, thousands) of friction points which in a general way cannot well be treated as complete as one would wish with a view to the elimination of friction. But much towards this end might be done by a thoughtful and prudent engineer, if his aim is directed towards reasonable economy.

HIGH-PRESSURE DISTRIBUTION FORMULÆ.

By W. MARSH HAMPTON, B.Sc. (Lond.).

THERE are three high-pressure distribution formulæ in general use, and (quoting from "Hole") these are as follows:

Coxe . . . . $Q = 41{\cdot}3\sqrt{\frac{d^5(P_1^2 - P_2^2)}{l}}$ $g = {\cdot}65$ (1)

Pittsburgh . . $Q = 3450\sqrt{\frac{d^5(P_1^2 - P_2^2)}{L}}$ $g = {\cdot}60$ (2)

Oliphant . . . $Q = 42\,a\sqrt{\frac{P_1^2 - P_2^2}{l}}$ (3)

where P_1 and P_2 are the inlet and outlet pressures in pounds per square inch

l = length in miles

L = " feet

d = diameter of main in inches

Q = quantity discharged, cubic feet per hour

and in the case of the Oliphant formula

a = a factor varying from 16·5 for a 3-in. main to 9330 for a 36-in. main

Frequently (*e.g.*, *vide* "Hole," Third Edition, pp. 38-40), discharges are worked-out by all three, as though by using three different formulæ, a greater approximation to the truth can be obtained.

The writer has had occasion to study these formulæ; and in the present article he will endeavour to show that the three formulæ are essentially the same, with the exception of a slight variation of the so-called "constant." Further, he will endeavour to derive a formula which will eliminate the confusion caused by having several others, and at the same time give results more nearly in line with experimental work.

The general type of the Coxe and Pittsburgh formulæ is:

$$Q = K\sqrt{\frac{d^5(P_1^2 - P_2^2)}{g.l}}$$

And the first thing is to reduce them all to this standard type.

(1) *The Coxe Formula.*

On incorporating the assumed value of g—*viz.*, ·65—into the general formula, the equation is derived:

$$Q = 41{\cdot}3\sqrt{\frac{d^5(P_1^2 - P_2^2)}{g.l}} \times \sqrt{{\cdot}65}$$
$$= 41{\cdot}3 \times {\cdot}8063\sqrt{\frac{d^5(P_1^2 - P_2^2)}{g.l}}$$
$$= 33{\cdot}3\sqrt{\frac{(d^5 P_1^2 - P_2^2)}{g.l}}$$

(2) *The Pittsburgh Formula.*

This needs, in addition to the incorporation of the value of g—viz., ·60—the conversion of the length in feet into length in miles. Thus:

$$Q = 3450\sqrt{\frac{d^5(P_1^2 - P_2^2)}{g.l}} \times \sqrt{\frac{{\cdot}60}{5280}}$$
$$= \frac{3450 \times {\cdot}7746}{72{\cdot}66}\sqrt{\frac{d^5(P_1^2 - P_2^2)}{g.l}}$$
$$= 36{\cdot}8\sqrt{\frac{(d^5 P_1^2 - P_2^2)}{g.l}}$$

(3) *The Oliphant Formula.*

The varying factor a in this case contains the value of $\sqrt{d^5}$ as well as the value of g, which has been assumed as ·60. Hence:

$$Q = 42 \times 16{\cdot}5\sqrt{\frac{d^5(P_1^2 - P_2^2)}{} \times \sqrt{\frac{{\cdot}60}{3^5}}}$$
$$= \frac{42 \times 16{\cdot}5 \times {\cdot}7746}{15{\cdot}59}\sqrt{\frac{d^5(P_1^2 - P_2^2)}{g.l}}$$
$$= 34{\cdot}4\sqrt{\frac{d^5(P_1^2 - P_2^2)}{g.l}}$$ for a 3-in. main.

Similarly, for a 36-in. main, the value of K is 39·0.

En passant, it is interesting to note that the original formula of Pole is a special case of the general formula above. Thus:

$$Q = 1350\sqrt{\frac{d^5 p}{s.l}}$$ l in yards. p in inches of water.

p in this case is the "difference" of pressure, or, to use the symbols adopted above, $P_1 - P_2$. Now since this formula applies only to small differences of pressure—*i.e.*, P_1 and P_2 are only very slightly different—

$$(P_1^2 - P_2^2) = (P_1 - P_2)(P_1 + P_2)$$
$$= (P_1 - P_2)\,2P_1 \text{ approximately}$$
$$= 2P\,(P_1 - P_2) \text{ where P is the atmospheric pressure.}$$

This is constant, and is incorporated in the constant 1350.

It is now apparent that the varying results obtained by the different formulæ are only due to using (unconsciously) a different factor, instead of an essentially different formula.

The factor K is, from above:

33·3 for the Coxe,
36·8 " " Pittsburgh,
34·4 to 39·0 " " Oliphant formula.

The question now arises as to which value of K gives the best average result; and, having decided this, it seems futile to keep in use three formulæ which differ so little from one another.

Using the data given in "Hole," the writer has worked out the discharges and the percentage variation from the measured value; the results being given in Table I.

TABLE I.

Author's Name.	Actual Discharge.	Coxe.		Pittsburgh.		Oliphant.	
		Disch.	Per Cent.	Disch.	Per Cent.	Disch.	Per Cent.
Newton .	18·200	16·000	−12·1	18·380	+ 1·0	17·840	− 2·0
Helps . .	5·000	4·876	− 2·5	5·604	+12·0	5·287	+ 5·7
" . .	10·000	7·380	−26·2	8·480	−15·2	8·011	−19·9
" . .	18·000	10·860	−40·8	12·470	−30·7	11·773	−34·5
Rice . .	16·170	13·600	−15·9	15·025	− 6·5	14·172	−12·4
" . .	22·860	18·100	−20·8	19·960	−12·7	18·750	−18·0

It appears from the above that the Pittsburgh value of K gives results approaching most nearly to those obtained in practice, though even these in general are somewhat low.

A value of K of about 40 seems to give results approaching on the average to the actual results tabulated above.

The discharges and the relative errors using this value are given in Table II.

TABLE II.

Actual Discharge.	Calculated Discharge.	Per Cent.
18·200	20·000	+ 9·9
5·000	6·100	+ 22·0
10·000	9·210	− 7·9
18·000	13·560	− 24·0
16·170	16·350	+ 1·1
22·860	21·700	− 5·1

With two exceptions, these results are probably within the limits of standardization of the conditions of the experimental work referred to; and as the formula contains an integral number as factor, the author suggests it as being satisfactory to replace the various formulæ at present in vogue—especially as the use of these tends to an idea of accuracy, which, unfortunately, is not confirmed on closer examination.

STRUCTURAL WORK IN THE GAS-WORKS.

By A CONTRACTOR'S ENGINEER.

STRUCTURAL work for use in gas-works, and no doubt in chemical works generally, has always been designed with some generosity; and this has been excused on the ground that corrosion quickly reduces the thickness of members below their original dimensions. Even painting is not always effective in checking this deterioration; and it is only a question of time before the structure will collapse, from the gradual wasting-away of the material of which it is composed.

Designers have generally met the difficulty by allowing for a low working stress per unit area; and this practice was perhaps excusable in the easy-going days before the war. The high prices which are now likely to rule will make it worth while to search out whether or not some of this metal is wasted and whether a different method might not give equal security with somewhat less expenditure.

It is not difficult to see that to use a stronger bar for a given load only actually provides for a proportionately longer life in certain cases. Corrosion takes place more or less evenly over the entire exposed surface of the bar. It removes gradually the outer skin as much from the outer surface of a thin bar as of a thick one. So that in the case of a flat bar used as a tension member (the simplest case to deal with), corrosion causes a definite decrement not in any way proportional to the original thickness of the bar.

For example, take the case of a tension bar to support a load of 10 tons. On the basis of a working tensile stress of 5 tons per square inch 2 sq. in. area would be provided; and the bar might be made either 2 in. by 1 in. or 4 in. by $\frac{1}{2}$ in. Let us suppose that corrosion takes place to the extent of $\frac{1}{16}$ in. in ten years. The first-named bar would be reduced to $1\frac{7}{8}$ in. by $\frac{7}{8}$ in., and the second to $3\frac{7}{8}$ in. by $\frac{3}{8}$ in., if the corrosion took place evenly over the whole surface of the bar. Let us tabulate the results:

	No. 1 Bar.	No. 2 Bar.
Original dimensions	2 in by 1 in.	4 in. by $\frac{1}{2}$ in.
Original stress	5 tons per sq. in.	
Final dimensions	$1\frac{7}{8}$ in. by $\frac{7}{8}$ in.	$3\frac{7}{8}$ by $\frac{3}{8}$ in.
,, area	1·641	1·453
,, stress, tons per sq. in.	6·1	6 88

In the second example the actual stress is 37 6 p. ct. more than was allowed for in the first instance. If the original bar had been very thin—say $\frac{1}{4}$ in. thick—the stress would have reached nearly 10 tons per square inch, which would be positively dangerous.

As an alternative, therefore, to the allowance of nominal low working stresses, in the first instance, it is proposed that the full safe stress should be calculated for, and metal definitely added to allow for the effects of corrosion. A section should be selected to support the calculated load with a stress of $7\frac{1}{2}$ tons per square inch (in mild steel). The section selected should be not less than $\frac{1}{4}$ in. thick, and the corresponding section $\frac{1}{8}$ in. thicker should be actually used.

For example, if a mild steel angle 3 in. by 3 in. by $\frac{1}{4}$ in. would carry the load at $7\frac{1}{2}$ tons per square inch, a 3 in. by 3 in. by $\frac{3}{8}$ in. angle would be used—thus making a definite allowance of $\frac{1}{16}$ in. all over the section to be removed by corrosion. The actual stress in the member, when new, would be 5 tons per square inch.

Economy can also be safely effected by the more careful and accurate estimation of loads on structures of all kinds. In this class of engineering particularly, it is usual to give up far too early the search for a rational basis for the estimation of loads, with the result that too many proportions are just guessed. Of course, a designer accustomed to a particular class of work will make remarkably near guesses when called upon to do so, as, for instance, when making a preliminary estimate of cost. But even a practical man guesses more effectively with a good supply of well-arranged facts in his notebook; and a lively scepticism in frequent exercise is a most conspicuous virtue in this as in all other departments of engineering. It is well to inquire into the circumstances in all sorts of members whose proportions have been taken for granted. Sometimes startling facts are thus discovered.

The first stage in design is the estimation of the loads likely to come upon the structure in question. The judicious estimation of such loads is by far the most difficult thing to do in design. And if this is not successfully done, no amount of thoroughness and care in subsequent calculations will make up for it. Of course, it is usual to cover any shortcomings in this all-important initial stage by a generous factor of safety. I believe that such factors are described in America as "factors of ignorance;" and I may leave it at that.

Loads on structures may be classified under these heads:

A.—Those which can be estimated with some certainty before any structure has been designed.

B.—Those which can be estimated from previous experience of similar structures—for example, the loads on retort-bench bracing.

C.—Those which cannot be satisfactorily estimated, and which must be evaluated on an empirical basis. The chief example of this is the wind-load.

A.—It is not proposed to give here any systematic list of loads which may be expected to come on structures of the class in question. As above remarked, the designer must rely on a well-kept note-book, and must obtain the data appropriate to each individual case. But under the first heading may be mentioned dead-loads, such as those due to the self-weight of the structure and the weight of the stationary objects to be supported by it. Self-weights of all structures should be carefully estimated in the first instance from similar structures already erected; and when the design is completed the actual weight should be ascertained and corrections made in the calculations. This is a simple precaution which is by no means often taken. In the case of roofs, it is usual to make an allowance for a layer of snow or ice. I shall refer to this when considering the question of wind-pressures. Live loads which come on these particular structures are almost always those which vary from a maximum to a minimum without change of the sign or nature of the stress induced.

A word of warning may be given as to the design of gantries for the use of locomotive jib cranes. It is not usual to weigh beforehand the load which it is attempted to lift with such cranes, with the result that sooner or later someone will try to overdo it with the jib at right angles to the track, and the whole weight of the crane, with a load which is defined as the "tipping load," will be thrown on one only of the crane girders. Another important point is that a suitable factor to convert a rolling or live load to an equivalent dead load is not to be overlooked. This factor (applied, of course, only to the actual vibrating load) varies from 1·1 to 1·5, according to the violence of vibrations to be expected.

B.—A common excuse is that it is "impossible" to assign a value to the loads on many structures, and the example usually given is retort-bench bracing. Nothing, however, could be easier than to obtain the loads on such bracing with sufficient accuracy for purposes of design. No doubt for the first bench of a particular type and size that is built, the bracing must be more or less guessed. But it is quite easy to observe after the bench is at work what deflections have taken place in all members of the bracing. From these, the loads on the members can be fairly accurately estimated; and modifications in design, on a rational basis, can be made for subsequent erections of the same kind.

Some interesting results were obtained in observations recently made on the bracing of a retort-bench with 18 in. by 7 in. rolled steel joist buckstays at 11 ft. centres and 8 in. by 5 in. horizontal joists about 5 ft. apart. The buckstays showed a deflection of $\frac{3}{4}$ in. in a span of 24 ft., which corresponds to a distributed load of 32·6 tons, and implies a stress of 9·4 tons per square inch. It was considered quite safe to work with such a stress in buckstays; but it should be pointed out that the factor of safety is no more than 3 with the usual Continental joists. The longitudinal joists showed no deflection outwards, which was indeed to be expected from the load on the buckstays; but they were considerably bent upwards by an amount increasing to as much as $\frac{3}{4}$ in. in the row of joists at the top of the setting. Such a deflection—coming in the plane of the flanges, and not that of the web—corresponds to a distributed load of 3·1 tons, or a stress of 12·5 tons per square inch. If, therefore, it were impossible to prevent this upward strain, these members would have to be greatly strengthened; and, indeed, the joist section would have to be considered quite unsuitable. It was found, however, to be possible to leave the ends attached to the buckstays in such a manner that the joists were free to move bodily upwards, as the brickwork expanded in this direction, so that they had only to resist an outward straining action. Thus, having due regard to other surrounding circumstances, it was practicable to reduce this section to 8 in. by 4 in. with a saving of 10 lbs. per foot run.

C.—Still there are many loads which cannot be satisfactorily estimated on a proper basis, and for which empirical values must be taken. The principal example of this is the load due to wind pressure.

The subject is one which leaves many engineers in a state of uncertainty; but extensive experiments initiated in the first instance by J. O. V. Irminger, of Copenhagen (see "Transactions the Institution of Gas Engineers," 1899—p. 187), and continued at the National Physical Laboratory (see Vol. V. of the "Collected Researches") have done much to set the matter at rest. In "Engineering" of Oct. 9, 1903, p. 508, Mr. T. Neilsen gave a full discussion of the results of the experiments and an interesting example of a roof truss treated as had been suggested by Mr. Irminger.

If these principles be accepted, on the windward side of buildings or similar structures, 9 lbs. per square foot of pressure may be allowed for, and on the lee-side, 11 lbs. per square foot suction or outward bursting pressure. On the windward slope of roofs up to 60 ft. span, wind pressure may be neglected, and on the lee-slope, 15 lbs. per square foot suction or outward pressure may be allowed for. All members of roof trusses should be made in stiff sections (such as angles or tees, instead of flats or rods, to avoid collapse under the slight compressive loads which may come on tension members with a reversal of the wind.

There is no doubt that if the loads on the structures are

fully estimated, and calculations based on the worst possible set of conditions, very much higher stresses than usual in gas-works practice can be allowed for in all members—due regard, of course, being had to the effect of corrosion on those members which cannot be systematically painted. I mean that, in ordinary rolled sections, a working stress of 7½ tons per square inch in both tension and compression for dead-loads can be permitted in first-class British materials, and up to 7 tons in inferior steel. While for loads which only occasionally reach a maximum, up to 9 tons per square inch may be permitted, provided that usually the stress does not exceed the 7 to 7½ tons above mentioned.

Steaming Verticals at Pernambuco.

Mr. Henry M. Balsam, of the Pernambuco Tramways and Power Company, Ltd., who has been practising the steaming of vertical retorts for the past two years with excellent results (and who recently contributed an article on the subject to the "JOURNAL"), has written to the American "Gas Engineering Journal" to say that, working under improved conditions, and with Arley coal, he has produced as much as 31,000 c.ft. of 440 B.Th.U. gas, or a total of 13,600,000 B.Th.U. per ton of coal, with a retort temperature of only 1100° C. These figures, taken as the average of several months' normal retort-house performance, were derived as total heat values. Recently, with a mixture of American and Lancashire coals, he has fallen somewhat below this, and can only show a production of 27,200 c.ft. of 445 B.Th.U. gas per ton of coal, or a total of 12,100,000 B.Th.U. per ton. Mr. Balsam adds: "There is nothing unusual about these figures except that they show the extent to which this process can be carried if necessary. Many are the theories that have been presented so far; but there is undoubtedly still much positive information to be acquired on the subject."

Basis of Gas Selling in Missouri.

The Sedalia Light and Traction Company having asked permission to charge for gas on the basis of the B.Th.U. supplied to the consumers, the Missouri Public Service Commission state that they do not feel justified in allowing such an innovation in gas sales to become operative at the present time, as the mode suggested has not as yet passed its primary experimental stage. They add that the gas consumers of the State have been educated to, and place no small degree of reliance in, the present well-established plan of paying for their gas consumption upon the basis of measurement by the 1000 cubic feet; and for the Commission to inaugurate so radical a change therein as suggested by the Company, at a time when the Commission have of necessity been required to establish an ascending trend of prices against practically all consumers would, in the opinion of the Commission, be wholly unwise. The Commission, at the same time, approved of the Company's suggestion to make a service charge, in lieu of the more common minimum charge. They express the opinion that the plan proposed is the more equitable, in that it more nearly assigns to each consumer the costs actually incurred on account of that consumer. It is pointed out by them that if a consumer is living in a house adjacent to a street containing a gas-main, he costs the company nothing until he becomes a consumer. As soon, however, as he elects to use the gas, the company are put to an additional expense, regardless of whether the consumer uses any gas. A meter is installed, and read, collections are made, the meter and service-pipe are kept in repair; and there are other gratuitous services and inspections.

A Rolling-Mill Gas Plant.

After having had it in type for nearly a year, it has at last been possible for the "Engineer" to publish an illustrated article descriptive of the Government rolling-mill at Southampton; but the factory is, of course, no longer being used for the work on which it was at that time engaged. At the height of its activity, it was producing 21½ million brass and 19¼ million cupro-nickel cups per week; and this was done without resort to night-shifts. These cups represent respectively the first stage in the production of small-arms cartridge cases and the sheaths with which the leaden bullets for these cartridges are clothed. All the melting furnaces, some of the annealing furnaces, and other heating plant in the factory, are gas-fired; and therefore much consideration was given to the gas-producer equipment. There are six blue water-gas generators, each with an output of 1,200,000 c.ft. per day, and four Kerpely gas producers, each capable of gasifying 20 tons of coke daily. The entire gas plant was supplied by Messrs. Humphreys and Glasgow; the Kerpely producers being made by Messrs. Appleby. The blue water gas is used for firing the melting furnaces; and the producer gas for heating those of the annealing furnaces which are gas-fired. As to the former, our contemporary says it is believed that the use of blue water gas for the purpose named is an innovation. The six generators and the four producers are fired entirely by coke. In the case of the former, the coke is, just before it enters the top of the generator, passed across a screen through which all pieces not in excess of ¾ in. fall, and are used elsewhere in the works. The gas-fired annealing furnace (of which photographs are given by the "Engineer") is Sir Arthur Duckham's patent. The furnace proper was erected by direct labour; while the charging machine was supplied by Messrs. W. J. Jenkins & Co., of Retford.

WAR-TIME GAS SERVICE IN AMERICA.

By J. ARNOLD NORCROSS, of New Haven, U.S.A.

[A Presidential Address to the New England Association of Gas Engineers, Feb. 19, 1919.]

A year ago, when you saw fit to honour me with the presidency of the Association, this country was at war. Though less than a year had elapsed after our entrance into the war, and our Army in France was still numerically small, the task of maintaining them and the million or more soldiers in our training camps on this side, together with the enormous preparations in progress for our vast war programme, had already completely disorganized the ordinary industries of the country. The gas business was no exception to the rule.

UNCERTAINTY OF COAL AND OIL SUPPLIES.

Owing to the complete breakdown of transportation, both rail and water, the New England gas supply was in a desperate condition. Stocks of coal and oil held over many years against emergency were exhausted, and we were forced to live from hand to mouth, not knowing when or whence the next shipment would come. Shortage of labour and its inefficiency seriously cut-down the supply from our regular coal contractors, and forced us to buy all sorts of coal from all sorts of people. Much of it never came, and some which did was so bad that we wished it had not come. Government-orders interfered with our shipments; the railroads confiscated the coal on the way to us; and it was no uncommon thing for our gas-works to get down to less than a week's supply of coal on hand. Some works, indeed, came within a few hours of closing down.

The gas oil supply was just as uncertain. Enormous shipments abroad, shortage of tank-ships, congestion and confusion on the railroads, brought many a gas manager and his undertaking to the verge of complete shut-down. There were many instances of only a few hours' supply of gas oil at the gas-works, and cases came to my knowledge of horse-drawn tank-wagons rushing any kind of oil to a gas-works about to close-down. Fortunate was the man in those days who had both coal-gas and water-gas plants of ample capacity; for he had two chances to the other's one. It was unlikely that both oil and gas coal would run completely out at the same time; and if anthracite failed, the coke sales could be interrupted and coke used for water-gas making. It was under these conditions that a meeting of the Directors of the Association was held on April 1, 1918. The fuel situation was thoroughly discussed, and a "Coal and Oil Committee" was appointed to carry out suggestions looking towards ensuring sufficient coal and oil to maintain the supply of gas in New England, and to co-operate with Mr. J. J. Storrow, the United States Fuel Administrator for New England.

LABOUR SHORTAGE AND DISCONTENT.

The labour situation was a source of endless worry. We had already lost many men to the Colours when the National Guard was absorbed into the army, and it was impossible to replace them in face of the competition for labour by the munitions plants, Government contracts on cost *plus* percentage basis, Government shipyards, and others. Voluntary enlistment and the army draft from time to time further depleted our forces, until it was impossible to properly conduct all the usual operations of the gas-works, and many things were left undone which were not for the moment vitally necessary. The remaining labour was restless and discontented. Wages were raised again and again; but, no matter what was paid, the men seemed obsessed with the idea that somewhere else much more could be had. Stories of the fabulous earnings of munitions workers and others set the brains of the workers on fire, and a veritable "wanderlust" possessed them. Thus there was a continual moving of men from job to job, and consequent inefficiency all around. The few old employees one could hold no longer kept up their former interest and loyalty, and they, too, in many cases, became as unsatisfactory and difficult as the new hands selected from the wandering fortune hunters who called at our gates. Every working man evidently thought that "Der Tag" had come, and conducted himself accordingly. I think I am safe in saying that no gas manager regrets the improvements in working conditions granted to the men in these stressful times, nor does he begrudge the increases in wages necessary to offset the shorter hours and the high cost of living during the war period. There is, however, a sense of bitter disappointment that men who have worked for us steadily and contentedly for many years, and in most cases enjoyed our consideration and regard, should sever the connection with little or no sign of regret, or, if they stayed, put forward exorbitant demands and gave a minimum return for what they received.

New construction was well-nigh impossible during the past year. Shortage of material and labour, and their excessive cost, Government restrictions, on both material and financing, and the high rate and scarcity of money, made it necessary to avoid extensions of works and mains, and to make the most of all existing plant. As the year wore on, the supply of coal and oil became more assured. The War Industries Board placed gas-works high up on the priorities list. The United States Fuel Administration had become thoroughly organized; and its systematic distribu-

tion of the output of coal and oil made itself evident, to our great benefit and relief. Before the end of the year, the gas-works of New England had, with few exceptions, a normal stock of coal and oil with which to meet the winter's demands.

The labour situation, on the contrary, became steadily worse. We began to substitute women for men in light labour, and were forced to plan far more extensive use of women throughout our undertakings. Whether we could ever have accomplished this in the heavier and rougher tasks is a question which will probably never be answered. It was done in England. Women were trained to be water-gas makers, retort-house stokers, and machine runners, coal and coke handlers, and they even fired boilers and clinkered furnaces. If the need had been imperative, I believe that our women would have responded to the call. But let us give thanks that the war ended, and both men and women were spared the hardships so bravely and wonderfully met in England.

SOARING COSTS OF PRODUCTION AND OPERATION.

The cost of production and operation, already excessive, kept steadily rising during the year. All our companies were forced to raise their rates. Some had to increase a second and third time. The increases from pre-war rates totalled generally from 20 cents to 30 cents per 1000 c.ft. It is notable that with very few exceptions there was no public opposition to the advanced schedules. The increases in rates were generally advertised, with details of the increased cost and other facts to justify the higher rate. The public were convinced of the justice of the step, and gave an exhibition of fairmindedness as surprising as it was pleasing. In this connection, we should recognize the wisdom and fairness of our New England Public Utility Commissions. They understood the difficulties and necessities of the situation, they appreciated the fact that good service depends on adequate means, and that a public service corporation without financial credit is not merely a disappointment to the stockholders, but a menace to the comfort and prosperity of its city. They had the courage of their convictions, and acted upon them. Had it been otherwise, many of our companies, large and small, would now be in the hands of receivers, and the public must have suffered through shortage of gas, bad quality, and poor service.

MEETING INCREASED DEMAND FOR GAS.

Another source of anxiety which came to many of us was the greatly increased demand for gas due to the new factories and large influx of munition workers into our cities, the use of gas for house-heating when coal was scarce or unobtainable, and the large increase in the industrial application of gas. Some of this business will stay with us, a permanent asset; but much of it fell away at once on the signing of the armistice. My own Company were experiencing an increase in sending out of nearly 20 p.ct. above the preceding year; but this fell off to almost nothing after the armistice. It was a striking anomaly for the ambitious gas manager, in the habit of putting forth every endeavour to increase his sales of gas, to suddenly have business thrust upon him, and to find himself in a position where the extra sales were more of a liability than an asset. Is it not food for thought, that, when the opportunity of a lifetime knocks at our door, it finds many of us short of materials and plant, and thus unable to embrace it through circumstances for the time being entirely beyond our control? One lesson stands out clearly—that we should always have a large surplus of coal, oil, and plant in reserve for unlooked-for emergency, and that all our producing capacity should be kept in perfect repair, ready for the demand which may or may not come.

BYE-PRODUCTS.

The bye-products of the gas-works have never come into such prominence as during the last year. There was a market for all the coke which could be spared from gas-works operations, and the prices obtained were higher than ever before. Ammonia was high in price, and there was not enough to supply the demand. Tar products of all kinds were in great demand, and the prices realized were good. Those who produced benzol and toluol reaped a return out of all proportion to the quantity, and, in addition, had the satisfaction of knowing that they were helping in the supply of explosives to win the war. So great was the need of toluol that the Government called upon the gas-works of the country to scrub-out all possible from the gas made. Government plants were erected for this purpose in most of the large gas-works of the country, and in a great number of medium-size works. The gas industry responded loyally to the call, and in most cases entered contracts by which they operated the Government toluol-recovery plants at net cost. Gladly, and without recompense, we took up the extra burden and the difficulties in distribution known to accompany the operation.

The importance of saving and using all our bye-products has been impressed upon us as never before, and the lesson learned will continue to make itself felt henceforth. It is my opinion that gas-works equipped with aqua-ammonia or sulphate plant, tar distillery, and solvent plant, were able, by reason of the extra return, to make gas about 10 cents per 1000 c.ft. less than works not so equipped, who sold the crude bye-products to others to refine and sell at a good profit. The cessation of hostilities unfortunately was followed by a slump in business which has temporarily made it impossible to market these products at any price. But this passing condition should not mislead or discourage. It is unlikely that the cost of crude materials and labour for gas making will ever return to pre-war levels. If, therefore, we are to do our best for the public whom we serve, we must strive for the uttermost efficiency in use of materials and labour, and must work up our bye-products to the last possible dollar.

NEED FOR INSTALLING COAL-GAS AND WATER-GAS PLANT.

Another fact which has become more apparent than ever before is the desirability of having both coal and water gas apparatus in our works. In the days when oil was cheap, rich carburetted water gas could be made more cheaply than lower heating power coal gas. The low first cost of water-gas plant, almost unlimited elasticity of production, the large production per man employed, and the general simplification of the gas-works, its operation, and distribution problems, tempted many to rely entirely upon this form of gas manufacture. War conditions soon changed the relative cost of the two kinds of gas. Notwithstanding the quite general abolition of candle-power standards and the adoption of reasonable B.Th.U. standards, the cost of coal gas has been of late lower than that of carburetted water gas. The oil producers report that the continual increase in demand for oil is not accompanied by a commensurate development of new production. The price of oil, then, must continue high. If this is so, every gas-works of reasonable output must instal a coal-gas plant or work at a disadvantage as to the price at which it can sell gas. The well-known advantages of the water-gas plant make it absolutely indispensable to every gas-works; but the present and probable economic conditions require that all but the smallest works should have a coal-gas plant as well.

LOWER HEATING POWER STANDARDS.

Perhaps nothing which happened to the New England gas industry in 1918 was of more importance than the establishment by our Public Utility Commissions of lower heating power standards. In Massachusetts and Connecticut, a minimum of 528 B.Th.U. was established. This last may still be too high, as some maintain; but it seems to me to be about right. We should have a standard which can be maintained with the usual qualities of gas coal and existing plants without recourse to expensive and wasteful enrichment, and one which gives satisfactory service in existing gas appliances. The value set for Massachusetts and Connecticut fulfils these requirements perfectly. Experience with it thus far gives no evidence of any increase in consumers' bills by reason of the reduction. All lighting appliances are more easily adjusted and maintained, mantles remain white, fuel appliances are more efficient, and the general report among our engineers is highly favourable from all points of view. We have demonstrated that the 528 B.Th.U. standard gives good service to the consumer, and that there is a saving to the companies in making it as compared with former higher standards. This benefit is shared by companies and consumers. We must aim at the standard which will give the greatest service to the consumer per unit of cost. I believe that we have come very near to this in the standard adopted in Massachusetts and Connecticut.

LESSONS OF THE PAST.

We have now passed successfully through what I believe is the most difficult period in the experience of living gas engineers. We have suffered shortage of materials for manufacture and repairs, we have operated with fewer men than would have seemed possible, we have put up with poor quality of the scant material and labour obtainable, and, in addition, we have faced financial problems which threatened to overwhelm us. Our resources and ability have been taxed to the limit, and yet not one of our plants has shut down, and the essential needs of our people have been fully met.

THE FUTURE.

We must now devote ourselves to the future. The conditions ahead of us call for the exercise of ability and hard work without limit. The policy of conservation, so firmly established during the war, must be applied with all our might. We must make the most of everything we have. The bye-products have helped some of us through the last two years. We must now more than ever save them and work them up into saleable form. The war demand and high prices for them have vanished; but we must find or create a market for them. I would especially urge you as far as possible to work-up a local market for everything you produce. You thereby avoid destructive competition and can divide with the consumer the saving in transportation charges, which are now higher and more seriously burdensome than ever. If you sell in your neighbour's territory, you prevent him from doing so, and force him to find a market in some other man's area—perhaps in yours. I cannot conceive of a community large enough to support a gas-works and not large enough to absorb most of the bye-products, if the market is thoroughly developed. Your public must be educated to use what is produced in their midst. Another advantage in thus thoroughly working up the local possibilities is to broaden our service to our public, and at the same time make our business less dependent on the sale of gas alone. I believe that in this direction lies low net cost of gas manufacture. Our duty to our consumers demands that we spare no effort to that end.

STEAMING RETORTS.

One of the most remarkable developments in gas manufacture during the war is the "steaming" of vertical and other retorts, as very generally adopted in England. The need for conservation in gas manufacture was much greater there than with us; and

this process appears to be the only thing that carried many of them through. The process really reduces itself to the making of coal and water gas in the same apparatus. This is an old ideal, and as yet no successful apparatus has been designed for its complete realization. Steaming, however, is a step towards this end. The steam and water gas in the retort permeate the pores of the coke, assist volatilization, surround and protect the volatile products, and rapidly carry them away from the zone of destructive decomposition. I might point out that the English report a yield of 16,000 to 23,000 c.ft. per ton of gas coal, with a heating value of 510 to 460 B.Th.U., or 8 to 10 million B.Th.U. per ton of coal, as contrasted with normal working of about 7 million B.Th.U. per gross ton. Expressed in another way, the yield was increased from 25 to 50 p.ct., with a sacrifice in heating power of 4 to 12 p.ct. At the same time, the yield of ammonia was increased 20 to 30 p.ct., the tar made was 10 to 20 p.ct. more, and the retorts no longer had to be laid off for scurfing. A start was made towards adopting this means of augmenting the yield from gas coal in several gas-works of New England, but the process has not received the attention at our hands which I believe it deserves.

Under the conditions which confront us we must do everything to increase the efficiency of all the apparatus we have, and adopt every improvement likely to decrease manufacturing cost. If trade revives in the near future, as predicted by almost all authorities who write on the subject, labour will soon again be scarce. We must therefore introduce labour-saving machines far more generally than heretofore—wagon and car loaders, locomotive cranes, conveyors, steam shovels, automatic stokers, trenching machines, caulking machinery, &c., should be adopted by every good-sized gas-works. Coal, oil, and labour are now more than double the former prices, while capital costs little more. We must therefore employ more capital, and so equip our business as to use less materials and labour. We should apply the same principle to the office, and introduce addressographs, calculating and accounting machines, and other labour-saving inventions.

CAPITAL AND LABOUR.

We should also strive to promote a better relation with our employees by every means possible. Recent events have awakened the working man to a sense of his power which, I believe, he will never forget. In other respects, he is no more enlightened than before. There is then but one way in which to check his unreasonable demands, and that is education. I do not refer to the so-called "book-learning," but to the knowledge of his community of interest with his employers. Teach him that the company is a complete little democracy made up of hundreds or thousands of small investors who have clubbed together to accomplish something which a few alone could not do; teach him that the company is not cold capital, but warm human beings; show him that he can be one of them if he chooses; let him see that the managers are servants of these people, and that they feel personal responsibility in doing well by those who work for them as well as those for whom they work. The successful manager in times to come will be he who feels himself as much a trustee for the interests of his employees as for his employers. Establish personal relations with the men—show an interest in them, and develop the same attitude in foremen and all who hold authority under you. The man is rare who will not respond in full measure to a kindly personal interest. If it is a new attitude, as it may be with some of us, he may at first be suspicious; but let him once feel sure that your interest is genuine and kindly, and he will give good measure in return. I believe that much of the time and money now put into supervision could be saved if but a small part of the time of those in authority from top to bottom was expended in this way. You know that happiness does not depend on money, and that other things in life are much more precious. But the working man too often believes that in money lies the whole secret of happiness. His employer is his only source of money; and he has become insatiable. Give him the things that money cannot buy, and you will satisfy his craving for human recognition. He will learn his lesson, pay you back in kind, and find contentment where he now sees only strife. Any plan of profit-sharing which results in placing the stock of the company in his hands, saving arrangements by which he acquires gas stock by instalments from his weekly pay, offers of new securities of the company on easy payments and favourable terms, are all excellent means towards a better understanding and an increased sense of community of interest. Such plans encourage thrift and accumulation of property by the men who take part. They thus improve their condition from year to year, become solid citizens and more valuable employees, and look forward with a hopefulness born of confidence.

MAKING FRIENDS.

Our relations with the public have heretofore received their full share of attention. The day of the "public be damned" policy is too remote to be remembered by most of those present. A high sense of obligation and responsibility towards the consumer has been developed in our industry. Due partly to pressure from without, partly to a more intelligent appreciation of the business value of a satisfied customer, but, I believe, largely because there is among us a sincere ambition to be useful to the people of our community, the modern gas manager is thoroughly awake to his interest and his duty, and strives to render to his public the best service in his power. It is to this end that we must do everything possible to bring down the cost of gas making. But we must go further, and do something to increase the return to the public in the appliances of utilization. There has been too much salesmanship and too little science in connection with the adoption of appliances for sale. I fear I am safe in saying that not one of us here is sure that he sells the most efficient gas-range to be had, and that the same is true of water-heaters, room heaters and fire places, and many other appliances. We should put an end to this condition, and select for our public the most efficient gas-burning appliances in existence. This policy would do wonders to stimulate the makers and inventors, and lead to rapid advances in efficiency of utilization. This is one of the benefits we may anticipate from the new and powerful American Gas Association, whose prospectus promises "to advance to the highest efficiency the methods of utilization." I have for years advocated the establishment by the gas industry of a central laboratory for gas research in general and for testing out and reporting on the efficiency of every gas appliance offered for sale. If the new Association undertakes such an enterprise, let us give it our support and profit by its work. Our consumers will thereby benefit greatly, and our industry will grow and broaden beyond our dreams, and find favour with all men.

DETERMINATION OF BENZENE AND TOLUENE.

The London Section of the Society of Chemical Industry, when they met on Monday evening of last week, at Burlington House (under the chairmanship of Dr. C. A. Keane), had a long programme before them. Indeed, it proved far too long to be got through in the two hours at disposal. In the first place, many of those present were desirous of taking part in an adjourned discussion on a series of papers dealing with the subject of refractometry, which had been submitted at the previous meeting. Then there was the welcoming of Mr. Church, of the Barrett Company, a member of the New York Section, who was on a visit to London. Mr. Church made a nice complimentary speech; but, coming from America, he did not confine his attention solely to compliments. He had a practical suggestion to make—which was that the Society's "Journal" would be greatly increased in usefulness if there were included in it expressions of editorial opinion from the pen of some one qualified to write with authority on matters of interest to readers. In the course of his reply, the Chairman made the statement that of 5000 members of the Society, about 1000 were in the New York Section—or the United States Section, as Mr. Church thought that it should be called, as it is the only one in America.

At this point, the three papers on the *agenda* were reached. One of them, by Dr. Spielmann, was postponed until the April meeting; another, on the setting of cement, was briefly dealt with by its author; and after this, about ten minutes remained to be devoted to the third. In these circumstances—and it being considered that the contribution lent itself to such treatment—it was decided that a brief indication of the scope of the paper should be given at the meeting, and that then the paper in full should be published in the Society's "Journal"—opportunity for discussion to be afforded later on, if deemed desirable. This paper was by Dr. Harold G. Colman and Mr. E. W. Yeoman, B.Sc., on the "Determination of Benzene, Toluene, &c., in Coal Tar and Similar Products, and in the Intermediate Products of Tar Distillation;" and Dr. Colman being on his voyage to the United States, it was presented by Mr. Yeoman, who explained that the paper was a purely analytical one, which would be best understood when seen in print. During many years, the authors have carried out a large number of tests of these products by methods of which sectional accounts have been in some cases published—this course, in the circumstances, being found desirable, without waiting for the complete investigation—and as further experience has resulted in further modifications and additions to the methods explained, a general account of them, and of the principles on which they depend, is given in the paper.

The general aim has been to get methods which would give results of reasonable accuracy with products of widely varying composition. Where the products to be analyzed only vary in composition within narrow limits, simpler and shortened methods can be employed giving results of sufficient accuracy in many cases; but where such methods are used on products differing widely in composition, they are apt to indicate results which, with abnormal samples, are far from accurate. The details necessary to obtain the desired results are contained in the paper. The fact was emphasized by Mr. Yeoman that the conditions under which the determinations are made must be the standard ones which were used in getting the results for plotting the necessary graphs. It would be ideal for each operator to construct his own graphs, using the apparatus which would be employed in making tests. But he does not anticipate this being done. The accuracy of the determinations depends more on the correct reading of the thermometer than on any other single thing; and the thermometer employed should be graduated in fifths and for an immersion of 100 mm., and be standardized at the National Physical Laboratory. The rate of distillation laid down should be strictly adhered to. It is possible for results within $\frac{1}{2}$ p.ct. to be obtained; and in any case the agreement between different workers should be within 1 p.ct. This, however, is only practicable if the conditions are as described in the paper, and the thermometers have been properly standardized. There seems, Mr. Yeoman added, no reason against

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employing the method described, under the section "Analysis of Commercial Toluol," for determining any three successive constituents of a homologous series, provided that their boiling-points are not too close together, and that they do not form constant boiling mixtures.

In the methods described, the products are if necessary subjected to a preliminary distillation and washing and fractionated into products comparable to: (*a*) Commercial benzol, (*b*) commercial toluol, (*c*) commercial washed solvent naphtha, and (*d*) commercial washed heavy naphtha. In (*a*) and (*b*) the benzene, toluene, &c., are determined by a simple distillation in a specified manner, and the results referred to the previously constructed graphs. The quantities found are then corrected for paraffins and carbon bisulphide, by means of specific gravity determinations. (*c*) together with the xylene found in (*b*) is an approximate measure of the washed solvent, and (*d*) that of the washed heavy naphtha.

REGISTER OF PATENTS.

Destructive Distillation of Carbonaceous Materials. No. 122,700.

WEST, J., of Southport, and GLOVER, S., of St. Helens.

No. 1815; Jan. 31, 1918.

This invention relates to the destructive distillation of cannel and other coals in continuously operating vertical retorts, so as to "give increased yields, both of fuel oil and of gas, per ton of coal carbonized beyond what are usually obtainable by present methods."

The patentees propose to employ continuously operating vertical retorts having therearound a plurality of superposed independent combustion chambers with (if desired) waste-gas circulating and secondary-air heating chambers. The general arrangement of the retorts and their setting are as described in patents No. 2663 of 1907 and No. 7757 of 1914.

According to the present method of working, the retorts are heated at their upper portion to a temperature of about 700° C.—about the temperature adopted in low-temperature distillation processes. The lower portion of the retorts is, however, heated to a temperature of about 1400° C.; and into this lower portion superheated steam is introduced. Preferably the steam is passed through or adjacent to the waste-gas flues and/or chimney of the retort-setting, where it is superheated by the hot waste gases leaving the setting, as described in patent No. 120,458.

With the combined high and low temperature system of working, the high fuel oil yields associated with low-temperature distillation is said to be obtained; but there are also obtained the high gas yields which result from high-temperature distillation, and the volatile matter and gas which are left therein after low-temperature distillation are effectually removed from the coke. The superheated steam entering the retorts in the high-temperature zone is converted into blue water gas, and as it rises through the retorts it "assists in the distillation process taking place in the centre of the coal charge—carrying off with it a large portion of the volatile matter from the coal, before the latter reaches the high-temperature zone, where it may be cracked and degraded, so reducing the yield of fuel oil."

The patentees say they are aware that it has heretofore been proposed to carbonize coal in vertical retorts by heating the retorts to temperatures which gradually diminish from over about 1500° C. at the lower part to below about 500° C. at the upper part. This prior process was also to be combined with the production of water gas—the latter serving as a vehicle for the distillation products from the coal and assisting the rapid withdrawal of the products in an undecomposed condition to cooler zones.

Atmospheric Burners.—No. 122,890.

WEYMAN, J. E., of Newcastle-upon-Tyne.

No. 2060; Feb. 5, 1918.

The invention has for its object the regulating of the air, both primary and secondary, in "scientific proportions to the gas" supplied to burners of the bunsen type, when the pressure of the gas varies. Although the invention more particularly refers to the use of blast-furnace or producer gas, it is applicable for other gases where the pressure varies.

The invention consists of more or less opening or closing the air-ports of the burner so that the air supply is always in the same proportion to the gas, though the pressure and supply of the gas varies; regulation of the gas, should it exceed a desired top pressure, being effected by the action of a governor, the movement of which synchronizes with the pressure in the main.

The burner consists of a circular casting having an outside annular chamber of the usual form at the combustion end, into which the secondary air enters by ports in a flange vertical to the main body. Against the flange, a loose disc or ring is fitted having corresponding air-ports in it which more or less cover or uncover the ports in the flange, in accordance with its position round the body.

At the opposite end, a branch, cast on at right angles, affords the gas supply connection; and on the end a cover is fitted having two or more rings of air-ports through which the primary air is admitted. On the cover, concentric tubes are cast projecting more or less into the main body or casting, and having independent connection with rings of air-ports. Carried on a stud fitted in the centre of this end cover is a disc or slide, with corresponding ports to those in the cover. This disc or slide for admitting the primary air, and the disc or ring at the other end for admitting secondary air, are connected by levers to a governor which, in its action of moving up or down in accordance with the gas pressure, revolves the discs, and thus more or less covers or uncovers the air-ports.

Supporting Cooking Utensils over Gas-Flames.—No. 123,013.

BUSWELL, A., and HARRIS, H. A., of West Bromwich.

No. 14,073; Aug. 30, 1918.

This means for supporting cooking utensils while being heated by gas-flames comprises a grid having constricted passages for the flame, and recesses or channels adapted to cause it to travel longitudinally of the grid bars. The grid is made up of a series of metallic slats aggregated in the form of a grid—being arranged in V formation, the V's being substantially closed at the bottom and opening upwardly, and being separated by narrow spaces of width considerably less than the major width of the V's.

Crucible Furnaces.—No. 123,039.

DAVIS, H. N., and TWIGG, W. R., of Luton.

No. 18,621; Feb. 28, 1918.

This invention relates to reversible regenerative furnaces of the crucible type; the fuel used being coal gas admixed with water gas, coke-oven gas, or oil gas—the air for combustion therewith being supplied under pressure.

The furnace more specifically comprises a crucible chamber, with annular regenerator chambers surrounding it; the air for combustion, under pressure, being supplied first in one direction through one of the chambers and after a suitable lapse of time in the opposite direction through the other chamber—the air entering the combustion chamber from the regenerator chambers tangentially of the space surrounding the crucible. Means are also provided to simultaneously reverse the direction of flow of the air and gas to the furnace.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for March 5.]

Nos. 4500—5170.

AUTO-SLOT GAS-METER COMPANY.—"Gas-meters." No. 4626
BERK & Co., F. W.—"Purification of coal gas." No. 5079.
CLARKE, D. H.—"Inverted mantle box." No. 4884.
CUMMINS, F.—"Vertical gas-retorts." No. 5002.
CUMMINS, F.—"Horizontal gas-retorts." No. 5112.
DAWKINS, A. W. W., W. A., & W. R. V.—"Gas-burner for lighting coal-fires." No. 5005.
FOSTER, T. J.—"Gas, &c., lamps." No. 4759.
GOLDSPINK, G. E.—See Auto-Slot. No. 4626.
HEWETT, F.—"Illuminating devices using gas, acetylene, &c." No. 4908.
HOOD, J. J.—See Berk. No. 5079.
INGRAM & KEMP.—See Foster. No. 4759.
LESSING, R.—"Rings for absorption towers, distillation columns, &c." No. 4967.
M'MINN, S. A.—"Glazing cement for use in fire-clay retorts and furnaces." No. 5075.
MATHY, M.—"Apparatus for heating by combustion without flame." No. 4855.
MATHY, M.—"Burner to be placed under crucible, &c." No. 4980.
NERRIÈRE, A. J.—"Apparatus for extracting coke from coke-ovens." No. 4604.
PENSON, F. A.—"Gas-lighter." No. 4921.
REES, E. V. & W. M.—"Elbows, unions, or joints for pipes, tubes, and conduits." No. 4547.
SMITH, J. S.—"Combination gas-cooker and water-boiler." No. 5065.
SMITH, W. S.—"Meters for indicating the rate of flow of fluids." No. 5091.
TOOLEY, G. W.—See Cummins. No. 5112.
WINTERFLOOD, B. W.—"Geyser, &c." No. 4930.

Southend Gas Company.—Improved conditions at Southend were reflected in the report for the half year ended Dec. 31 which was adopted at the recent meeting of the Southend Gas Company. It was therein stated that there had been an increase in the sale of gas for the half year equal to practically 13 p.ct. over the corresponding half of the previous year, and that this was largely accounted for by the return of residents who had left the district owing to danger from air-raids. The general coal shortage, of course, affected the Company; and at times it was difficult to maintain the supply of gas. Last summer a considerable quantity of coal, bought under contract, was, by order of the Coal Controller, diverted to some of the London companies, with the result that late in the year the Company's stocks were dangerously low, and emergency coal had to be purchased at a very high price. Indeed, it was forced upon them by the Coal Controller. The Directors see little prospect of an early decrease in the selling price of gas. The balance of the profit and loss account showed an amount available of £5930; and dividends were declared for the half year on the original and new ordinary stocks at the rate of 4½ p.ct. per annum, and on the new ordinary "B" stocks at the rate of 4⅛ p.ct. per annum (all less income-tax at 6s. in the pound), leaving £1187 to be carried forward. In the course of his remarks, the Chairman (Mr. J. H. Burrows) said that the Secretary (Mr. J. T. Randall) had continued to serve them excellently; and the Board were specially satisfied with the new Engineer (Mr. T. F. Canning).

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Richmond's Wash-Boiler Tests.

Sir,—On p. 446 of the "Journal" for March 4, Messrs. Richmond state "that the gas consumption of a 10-gallon washing-boiler may be reckoned at about 30 c.ft. per hour."

Surely, this is an error; for if 60 c.ft. per hour of 500 B.Th.U. total heat are used in raising 10 gallons of water from (say) 52° to 212° Fahr., which is necessary in "boiling" cottons and linens, we obtain approximately 53 p.ct. effective, which is a very good average under working conditions. Thus:

100 (lbs. of water) × 160° (T° rise) × 100 ÷ 60 × 500 = 53·3 p.ct.

Hence, if only 30 c.ft. were necessary, an efficiency of 106 p.ct. would be obtained, which is obviously impossible.

E. L. Oughton.

Longwood, March 6, 1919.

Temperature Rise in an Oxide Purifier.

Sir,—In reply to Mr. Bradshaw's letter in your issue of the 4th inst., regarding temperature rises in oxide purifiers, I send you the following working experience for whatever it may be worth to those interested in the subject.

We make 37,000,000 c.ft. of gas per annum; and we purify all our gas with three oxide boxes, each 9 ft. by 9 ft. by 4 ft. During the summer load, it is easy; but in the heavy winter months it is at times difficult, and during these heavy months we have to change a box once each week. Our oxide is so arranged that each batch is thoroughly aired, through and through, for one week before it is returned to a box. Any success with our purifiers has been due to admitting sufficient air to keep the oxide in each box at about 80° Fahr. I cannot say what percentage of air we admit; but sufficient is allowed to enter at the condensers to keep the oxide at the temperature mentioned, at all times of the year and under all conditions of weather. The boxes are in the open.

Now, from my experience, it is quite possible to obtain what temperature one likes in oxide purifiers by the admission of air; and it occurred to me that Mr. Bradshaw may be drawing in air in other ways than through his usual understood channel. I conclude that he uses some air, because it is the only way to obtain the correct results with oxide purification—understanding that other arrangements are in order.

A Country Gas Manager.

March 7, 1919.

Position of Gas Companies under the Wages Award.

Sir,—The recent award of the Court of Arbitration under the Wages (Temporary Regulation) Act, 1918, has emphasized the serious position of the gas industry. But what is still more serious is its apparent apathy. Awards are immediately followed by fresh demands; but nothing is done to rehabilitate the industry in the commercial world.

Is it to be understood that the Temporary Increase of Prices Act is satisfactory to the majority of companies? I do not think anyone will say so. Then let this inertia be thrown off; and let the National Gas Council without delay give the Government to understand that the industry throughout the country is determined to recognize no further applications, negotiations, or arbitrations for increased wages or reduced hours, until they have enabled every undertaking to obtain value from the consumer for the gas supplied, and to pay their shareholders at least their standard or pre-war dividends. Sooner or later this will have to be done; let it be done at once.

It is now time for the President of the Board of Trade to redeem his promise that substantial justice shall be done to the industry.

March 3, 1919. Action.

Decimal Coinage.

Sir,—With reference to my article in your issue of Feb. 25, I should be obliged if you would allow me to point out that the total value of the gas (p. 388), new system, should be 8·10 (mals) and not £8 10s., as printed. Also, p. 387, par. 9, line 4, 20-10ths should read 20s. 10d.

Perhaps, at the same time, you would allow me to illustrate very briefly how the method advocated affects the calculation of wages.

Taking a week of (say) 54 hours at 9d. per hour, an income of £2 0s. 6d. is shown. The rate is three-quarters of 1s.; and by adding three-quarters of one mal, we get

18·75d. × 54 = 10·12 (10 ÷ 10 × 2) . . . . . =	£2	0	0
(·12 ÷ 2) . . . . . =	0	0	6
This is a shortened process and shows the exact sum to be paid, viz.	**£2**	**0**	**6**

It will, therefore, be apparent from the above, together with what is stated in my article, that no change actually takes place, either in income or expenditure.

As regards copper coins (in order to use penny-in-the-slot machines, &c.), it will, of course, be necessary to exchange 1s. (of 25 mals) into 12½d., as this is the actual new value of the 1s. The additional halfpence must not, however, be put into penny-in-the-slot meters (gas companies will adopt one of the methods already suggested for recovering them). Shilling slot-meters are entirely unaffected.

In conclusion, and, as an additional safeguard, until people familiarize themselves with the idea that 4s. no longer equals 48d. but 50d., it would perhaps be as well for those who pay wages to take a "Ready Reckoner," and (calculating at the old rates) note in pencil the amount to be paid under the total mal value.

Parkstone, March 1, 1919. G. W. Limmer.

Eight-Hours' Day.

Sir,—*Re* the letter by "Perplexed" in your issue of the 4th inst., I submit the following opinion for what it may be worth to those interested.

It is impossible to suggest any definite scheme for dealing with the difficulties mentioned without being practically acquainted with the local conditions of each case. In works of 15 millions and over, it should be easy, and quite profitable, to work the eight-hour shift in place of the twelve. I am not clear if "Perplexed" wishes for opinions as to how to solve the additional financial responsibility, or how to apply the eight-hour scheme in a working method. We are a 37-million works, and we work the eight-hour shifts as follows:

"A" Shift,	6 a.m. to 2 p.m.	On Saturday, the shift works from 9 a.m. to 8 p.m.
"B" ,,	2 p.m. to 10 ,,	This shift finishes up on Friday night, and comes on again at 8 p.m. Saturday night.
"C" ,,	10 ,, to 6 a.m.	On Friday night this shift works through till 9 a.m. Saturday morning, and comes on again at 6 a.m. Sunday.

"A" Shift totals 51 hours for the week.
"B" ,, ,, 59 ,, ,,
"C" ,, ,, 58 ,, ,,

Seven eight-hour shifts totals 56 hours for the week. We pay time-and-a-half for Sunday. I think you will find the arrangement described works out in a fair average for each shift.

Referring to the remarks of "Perplexed," regarding 10-million works and under, he will have to increase his make per man per shift. It is far too low. Probably the stokers do other work, or he may be handicapped with the retorts available. In any case he will have to increase the make per man. With these new conditions, the stokers will have to be confined more to stoking, and more unskilled labour be introduced even in the smallest of works. These increased expenses have got to be faced; and to manufacture gas in the most profitable way a more managing spirit will have to be introduced into many large as well as small works—a managing spirit tempered with strong scientific and technical knowledge, and a general business experience on broad lines, with the right men in the right jobs.

It is very apparent throughout the gas profession that it is feeling the effect under the present strain of the laxity which has been exercised in the past by those responsible for finding the right man for the right job, large or small. There has been too much of the "Friend of the Family" spirit and other social influences used as a deciding factor in finding the right men. I am not making any suggestions against "Perplexed" or any other particular person; also I am thankful to be able to say that I have a very comfortable job myself. But I am sure there are many who will agree that the gas profession has not had the stiffness of back in the past which it should have had, and which will be very necessary in the future.

March 8, 1919. A Country Gas Manager.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

The Examiners reported that the further Standing Orders applicable to the South Shields Gas Bill had been complied with.

The Sheringham Gas and Water Bill and the South Shields Gas Bill were read a second time, and committed.

The following Select Committee, to meet on Wednesday, the 26th inst., has been appointed: The Marquess of Bath (Chairman), the Marquess of Linlithgow, Earl of Malmesbury, Earl of Eldon, and Lord Leigh. The group of Bills to be considered by them include the Brentford Gas Bill, the Stourport Gas Bill, the Sunderland Gas Bill, and the Hartlepool Gas and Water Bill.

HOUSE OF COMMONS.

Output of Coal Mines.

Commander Hamilton Benn asked the President of the Board of Trade whether he could give the output of coal per man employed in mines in Great Britain for anthracite and bituminous coal, separately, and how this compared with the output by American mines.

Mr. Bridgeman, who replied, said that practically the whole of the anthracite coal was produced in South Wales. The annual output of anthracite coal per man employed, based on the first six months of 1918, was 207 tons, and of other coal in South Wales 222 tons. The corresponding figures for the United States for the year 1916 (the latest figures available) were: Anthracite, 548 tons; bituminous coal, 896 tons. [The American ton is a net ton of 2000 lbs.]

The Dye Industry.

Sir William Barton asked the President of the Board of Trade: (1) Whether German chemical companies were rapidly reorganizing for peace conditions and raising fresh capital for further development; and whether he was satisfied that the chemical and colour-making undertakings in this country were making sufficient progress to secure the supply in quantity and quality necessary to the maintenance of our pre-war export of manufactured goods. (2) Whether, having regard to the Prohibition of Import (No. 29) Proclamation, 1919, he would undertake that derivatives of coal tar and all direct colours which might be prohibited would be produced and sold in this country at the same price as they were, or might be, sold by

German producers to other countries engaged in competitive manufacturing industries.

Mr. BRIDGEMAN (the Parliamentary Secretary to the Board of Trade), who replied, said he was satisfied that very substantial progress had been made by the dye industry in this country, and he had every reason to believe that it would now become much more rapid. The question of price was one which would have to be taken into account in determining the extent to which import licences should be granted. Dye-users were strongly represented on the Licensing Committee.

Major HAYWARD inquired what steps had been taken, or were proposed to be taken, to control prices of aniline dyes so that the industries dependent upon these products should not be prejudiced by the prohibition of imports.

Mr. BRIDGEMAN replied that, while it was not proposed to control prices directly, the question of price would have to be taken into account in determining the policy of admitting dyes under licence.

Sewage Treatment and Lighting Gas, &c.

Lieut.-Colonel Sir J. NORTON GRIFFITHS asked the President of the Board of Trade whether he could give the results of any experiments conducted indicating the presence of considerable quantities of gas, of sulphate of ammonia, and of lubricating oil in town sewage; whether these substances could be profitably extracted and converted to economic use; and whether, if reliable experimental results were not available, exhaustive measures would be taken to determine the value of sewage matter as a source of supply of this gas, sulphate of ammonia, lubricating oil, and fertilizers.

Mr. BRIDGEMAN (the Parliamentary Secretary to the Board of Trade) replied that proposals for the conversion of sewage and sewage sludge into products of utility were now receiving the careful consideration of the Government. The Local Government Board were, he believed, at present engaged investigating the matter, and a report was in course of preparation by the Ministry of Munitions.

Electricity Supply.

Sir JOHN HARMOOD-BANNER asked the Prime Minister whether the special ministry proposed to be set up to undertake the development on behalf of the State of the supply of electricity would be an independent ministry or would be a branch of the Board of Trade or of any other Government Department; and what would be the position under the new arrangement of local authorities who were now supplying electricity.

Mr. BONAR LAW, in reply, referred to the terms of the Bill for the creation of a Ministry of Ways and Communications.

Mr. TERRELL asked the President of the Board of Trade whether he was now in the position to give any information concerning the Government scheme for the supply of electricity to provincial towns and villages.

Mr. BRIDGEMAN, who replied, said that the President of the Board of Trade hoped that it would be possible to introduce a Bill dealing with the supply of electricity in the course of a few days.

Coal Output in the United Kingdom.

Mr. BRIDGEMAN, replying to a question by Mr. Wason, said that the output of coal from mines in the United Kingdom during the years 1914 to 1918 was as follows: 1914, 265,643,030 tons; 1915, 253,179,446 tons; 1916, 256,348,351 tons; 1917, 248,473,119 tons; and 1918 (provisional estimate), 227,987,000 tons.

Coal Output per Man in the United Kingdom and America.

Captain HAMILTON BENN asked the President of the Board of Trade whether he could give the reason why the output of coal per man employed in America was more than double that per man in Great Britain.

Mr. BRIDGEMAN, who replied, said he was informed that, among the causes for the difference, were the facts that the pits were shallower and the seams thicker and easier to work in America than in this country, and that the collieries were more recent in their development and equipment. It was also possible to replace hand labour by mechanical coal-cutters to a greater extent in America than was possible in the United Kingdom.

Mr. GIDEON MURRAY asked whether a comparative statement could be furnished showing for the United Kingdom and the United States, respectively, for the years 1886, 1906, and 1912 the number of tons of coal per wage earner per annum, and the value of a ton of coal at the pit mouth.

Mr. BRIDGEMAN said he proposed to publish a statement giving such of the information as was available. The statement referred to is as follows:

—	Annual Output per Person Employed in Coal Mining.	Average Value per Ton at the Pit-Mouth.
	Tons.	s. d.
United Kingdom,* 1886	315	4 10
,, 1906	292	7 3½
,, 1912	246	8 11¾
United States, 1886	No information	6 4¼
,, 1906	577	5 9½
,, 1912	660	6 1

* The figures for the United Kingdom included dirt raised with the coal. Only in 1912 was it possible first to exclude dirt from the statistics, and if this were done, the output of clean coal per man was 244 tons, of a value of 9s. o¾d. per ton.

Mr. SHORTT (the Home Secretary), replying to a question by Mr. Robert M'Laren, said that, taking the period of five years before the war, 1909-1913, it appeared that the average annual output of coal per person employed in the United States was rather less than two and a half times the average output of mineral raised in coal mines in the United Kingdom. The same result was obtained if a comparison were made between the figures for 1916, which was the latest year for which the American figures were available. The main reasons for this difference had already been dealt with by Mr. Bridgeman in reply to a question by Captain Hamilton Benn.

Benzol Extraction from, and Inerts in, Gas.

Sir KINGSLEY WOOD asked the President of the Board of Trade if he was aware that the quality of gas in London had considerably depreciated by the extraction of benzol, and by reason of the presence of an undue proportion of incombustibles; and, inasmuch as the extraction of benzol was no longer necessary for munition purposes, whether he would take steps to secure, for the benefit of consumers, a return in this respect to pre-war conditions.

Mr. BRIDGEMAN (the Parliamentary Secretary to the Board of Trade), who replied, said the question of the conditions of gas supply in the Metropolis and elsewhere had been carefully considered by the Board, and they had come to the conclusion that as these conditions were still in many respects abnormal it was impracticable to require gas undertakers to revert at once to pre-war standards. The Board had accordingly suggested to the local authorities throughout the country that until the end of June next proceedings should not be taken in respect of deficiencies in the calorific power of gas, so long as it did not fall below 450 B.Th.U., and so long as the proportion of inert constituents in the gas was not excessive.

MISCELLANEOUS NEWS.

LONDON COUNTY COUNCIL AND THE GAS SUPPLY.

Report of the Public Control Committee.

The London County Council, at their meeting last Tuesday, had presented to them a report by the Public Control Committee, on the subjects of the accounts of the Metropolitan Gas Companies and the quality of the gas that is being supplied. The report is reproduced in full, together with the remarks made by the Chairman of the Committee (Mr. A. L. Leon, J.P.), in moving that the report be received.

ACCOUNTS OF THE GAS COMPANIES.

1.—On Feb. 18, 1918, we reported the action taken with regard to the applications of several London Gas Companies for Orders under the Statutory Undertakings (Temporary Increase of Charges) Act, 1918, modifying the sliding-scale conditions so as to enable the Companies to pay dividends at three-fourths of the respective standard rates of dividend, notwithstanding that the price of gas would not otherwise permit the distribution of dividends at such rates.

We also reported that the Orders made by the Board of Trade had fixed maximum prices for gas as under—

	Per 1000 c.ft.
Gas Light and Coke Company	4s. 4d.
Commercial Gas Company	4s. 2d.
South Metropolitan Gas Company	4s. 4d.
South Suburban Gas Company (London area)	4s. 3d.

These prices were the actual prices charged by the Companies at the times of making the Orders; the Gas Light and Coke Company's price having been raised to the above-mentioned figure as from the Midsummer readings, and the other Companies' prices raised as from the Michaelmas readings. The accounts of the Companies for the year 1918 have now been published; and we deem it desirable to inform the Council of the effect of the Orders on the revenue accounts of the Companies.

The effect of the increased charges is shown by the following figures, giving the difference in the balance of revenue account (after payment of the dividend) as compared with the corresponding figure for the previous year or half year—

The Gas Light and Coke Company shows an increase of £129,700 for the year.

The Commercial Gas Company shows an increase of £8939 for the half year.

The South Metropolitan Gas Company shows a shortage of revenue of £3729 for the half year, but an improvement on the previous half year of £19,574.

The South Suburban Gas Company shows an increase of £13,460 for the half year.

The Statutory Undertakings (Temporary Increase of Charges) Act, 1918, provides that no modification of the powers of charge of a gas company shall be authorized which is more than sufficient to enable a dividend on the ordinary stock of the undertaking to be paid at three-quarters of the standard rate of dividend or at three-quarters of the pre-war rate of dividend, whichever is the lower. It will be seen that, except in the case of the South Metropolitan Gas Company, the authorized price has proved to be in excess of that required to give the relief contemplated by the Act.

Each of the Orders granted by the Board of Trade contains a provision as follows—

> No dividend shall be paid by the Company upon their ordinary capital in respect of any half year during the continuance of this Order, until a certificate has been furnished to, and accepted by, the Board of Trade, signed by an accountant approved by the Board, that the accounts of the Company are correct, and are compiled in accordance with the statutory requirements relating thereto, and that the revenue account has not been debited with any expenditure or appropriation of an improper nature or different in character from those usually debited by the Company in the revenue account for any previous half year; and where any item of expenditure or appropriation or the amount to be carried forward to the credit of the profit and loss account for the next following half year is greater than the corresponding item in the

revenue account for the immediately preceding half year, such certificate shall contain a statement explanatory of such increase.

In cases in which certificates appear to be necessary, we have asked to be furnished with copies thereof, with a view to making any desirable representations to the Board, for the revision of maximum prices, as provided in the Orders.

It is, of course, difficult for the Companies to estimate accurately the charge necessary to preserve equilibrium; but from an examination of the figures available, we are led to the conclusion that the present maximum prices are somewhat in excess of those necessary to give the relief contemplated by the Act, and will need to be revised by the Board of Trade as and when opportunity occurs. At the same time, we have no evidence that the Companies are not prepared to adjust and reduce the charge as occasion demands. The Commercial Gas Company have, in fact, given notice of a reduction from 4s. 2d. to 3s. 8d. per 1000 c.ft. as from the Christmas readings, and the South Suburban Gas Company have reduced their charge by 3d. per 1000 c.ft. from the same date. It will readily be appreciated, however, that the main point to be guarded against is that the Companies should not be permitted to take advantage of the suspension of the sliding-scale to increase their revenue balances to an unusual extent. Should such increase be permitted during the present period of fixed dividends, the Companies would, out of the present burden on the consumer, obtain an unfair benefit when sliding-scale conditions are resumed.

Quality of Gas.

2.—On Dec. 17, 1918, we submitted a report as to the quality of the gas supplied during the war by the three large Metropolitan Gas Companies. We pointed out that, while the quality of the gas had depreciated by the extraction of benzol for use in the manufacture of munitions, there had been in the case of the gas supplied by two Companies a further depreciation by reason of the presence of a proportion of "incombustibles" beyond that which had previously obtained, and that we were considering what steps could be taken to secure for the benefit of consumers a return to pre-war conditions.

The Board of Trade have since addressed to the Council and to other local authorities possessing supervising powers over gas companies, a communication intimating that the Coal Controller had urged that, in view of the stringency of the coal position, no change in existing methods of manufacturing gas should be allowed which would have the effect of increasing the consumption of coal or of diminishing the use of water-gas plant for supplementing the output of coal-gas plant, and that the amount of oil available for enriching purposes is limited, and its price so high that any increase in its consumption would have the result of further raising the price of gas. Having regard to these and other circumstances, it was felt to be impracticable to place on gas companies an obligation immediately to revert to pre-war standards; and the Board suggested that the general interest would best be served if local authorities would refrain from taking proceedings in respect of deficiencies of calorific power which did not fall below 450 B.Th.U., provided the proportion of inert constituents was not excessive. The Board did not contemplate that the relaxation of statutory requirements would continue beyond the end of June, 1919.

Only one of the London Gas Companies is subject to a calorific standard; and, on the basis of that Company's statute, and using a round figure, the minimum calorific power of London gas should not be less than 500 B.Th.U. gross. The minimum and average calorific power of the gas of the three large Metropolitan Companies during the quarter ended Dec. 31, 1918, is shown in the following table—

Company.	Calorific Power (B.Th.U.).		Percentage of Incombustibles.
	Minimum.	Average.	
Gas Light and Coke Company . . .	440·0	469·5	20·3
Commercial Gas Company	454·2	486·2	17·0
South Metropolitan Gas Company .	510·9	555·7	13·2

In 1913, the average calorific power of the gas supplied by these three Companies was 540·0, 536·9, and 571·0 B.Th.U. respectively. It will be seen, therefore, that the quality of the gas of the two North London Companies is considerably below pre-war standard; the depreciation being due principally to the extraction of benzol and to the presence of excessive inert constituents. If the benzols were now retained, the quality of the gas would be improved without affecting the coal consumption or the make of water gas. If, in addition, the inert constituents were reduced in quantity, so that these two Companies conformed to the practice of the South Metropolitan Gas Company, the calorific value of their gas would be still further enhanced. It is generally known that the benzols recovered from gas are now largely available for the motor industry; and representations have been made to us that no action should be taken by the Council which would tend to deprive motorists of this supplementary supply of liquid fuel. We think, however, that the gas consumer, having submitted so long to the supply of a gas which has been weakened in the national interest, is now justly entitled to a gas which shall only fall short of the pre-war standard to the extent necessary to economize the consumption of coal and oil. In this connection, the following extract from the half-yearly report (July to December, 1918) of the Directors of the South Metropolitan Gas Company is of interest—

> "The abnormally heavy cost of coal emphasizes the urgent necessity of securing the most efficient results from its carbonization, and justifies the policy of distributing through the mains and service-pipes the benzol contained in purified gas in order to satisfy the requirements of the public for light and heat. In this connection it may be mentioned that had the Company reduced the quality of gas to the standard allowed under war conditions, its customers would have required at least 10 p.ct. more gas to give the same amount of heat, and they would have had to pay during the six months an additional amount of not less than £127,474."

In all the circumstances, we feel that, while the Council may well assent to the representations of the Board so far as they relate to economy in coal and oil consumption and the make of water gas, a determined effort should now be made by the Council on behalf of the consumer to secure a return to pre-war conditions as regards the debenzolizing of gas and the loading of gas with incombustibles. In our view the proposal of the Board, if adopted, would allow far too much latitude to gas companies, and we regard with concern the suggestion made by the Board that this period of latitude may extend to the end of June.

We are, therefore, strongly of opinion that the Order of the Ministry of Munitions of June 28, 1918, by which, for the time being, the operation of the gas statutes has been suspended, should be revoked or amended at the earliest possible date, in order that the consumer may have the full benefit of the retention in the gas of the benzols lately extracted as a war measure. We recommend—

> (*a*) That as the extraction of benzol from manufactured gas is no longer necessary for munition purposes, and its extraction, together with the presence of an unreasonable proportion of incombustibles, unduly reduces the calorific value of gas, and as the retention of benzol and a reduction in the quantity of incombustibles would not involve an increase in the consumption of coal, the Council is of opinion that the Order of the Ministry of Munitions, June 28, 1918, should be immediately withdrawn or amended.
>
> (*b*) That the foregoing resolution (*a*) be communicated to the Board of Trade.
>
> (*c*) That a copy of the foregoing report be sent to members of Parliament representing London constituencies, with a request that they will take such action as may be possible to give effect to the Council's views.

Mr. A. L. Leon, J.P. (the Chairman of the Public Control Committee): In moving the reception of this report, I want to say a word on section No. 2. A great many misstatements have appeared in the Press which I desire to take this opportunity of correcting. It has been stated in the Press that the extraction of benzol from gas has very little (if any) effect on its heating power. That is really contrary to the fact. It is true that the amount of benzol taken from gas affects only 5 p.ct. of the heating units of gas. Gas is supposed to have 500 B.Th.U. of heating power at the present time; and 5 p.ct. is enough to make a very considerable difference indeed. It is quite wrong to say that the loss in heating power by the extraction of such an important element as benzol and the hydrocarbons in the gas is not to make any difference in the heating power of the gas. Consequently, a great deal is lost by the consumers who use gas.

I have myself had a letter—I do not know whether it is intended for me privately, or as Chairman of the Public Control Committee—from the Secretary of the Automobile Association, in which he asks that the Council will see its way to alter its policy, and to allow the existing Order of the Government to be maintained, which is going to extract from the gas the benzol and toluol which used to be in the gas before the war. Of course, I have not been able to advise the Committee that we should take such action as would benefit the consumers of benzol and petrol for motor traction to the injury of gas consumers in London. After all, we represent first the ratepayers from the gas point of view as gas consumers, and not the whole of the motorists of the United Kingdom, who would no doubt benefit considerably if the 61,000,000 gallons that I understand are available throughout the country were available for motor traction. Motor traction is all right in its way, and wants encouraging. I am very much opposed to the "Petrol Ring," because they keep up the price; and I am anxious to break the "Petrol Ring," who seek to deprive people of having anything which is to take the place of petrol. That is quite right; but I think we should be wanting in our duty to our constituents if we allowed the motor users of the country to take away from the gas consumers what forms an important part of the heating power of gas. We have therefore taken as strong action as we can to-day. I would not be consistent if I did suggest such action as is proposed in the letter to which I have referred. We have not received a deputation from the Automobile Association. They asked us to receive a deputation. Whether the Committee will do so or not, I cannot say.

The saddest part of the whole thing is the kind of conspiracy which is being entered into by the Gas Companies and the Benzol Distributors' Society. The Acting Director of the Gas Light and Coke Company—the biggest Company in London—is, I understand, President or Chairman, or is acting in some official capacity on the Benzol Distributors' Society or organization. I do not know what the name of it is; I only saw in the paper that he presided at a luncheon given at the inauguration of this body. It is rather a pity to see the Acting Director of the most important Company in North London certainly being directly interested in the sale of benzol as a motor fuel. I am sorry he has taken up that position. I have no reason to think he does not want to do his duty to his Company; but I am sure it will be a difficult position which he is now trying to occupy.

But, if the Board of Trade will not give way in regard to benzol, there is an even greater loss to the consumer by the large amount of incombustibles in the gas. I may inform the Council that of the amount of what is called gas that goes through the meter, 20 p.ct. of it is not worth anything at all for heating purposes. I should like to say that the poorer population of this country who consume their gas entirely by meter lose a larger proportion of the cost than any other part of the population. I think it would be a thousand pities if we were to stop exercising any pressure that we can on the gas companies to restore the heating power of the gas to what it was before the war. During the war the gas companies were a very important factor in regard to providing benzol and toluol for the Government for high explosives; but that time has gone, and we have been told that it is not now necessary for national purposes to keep benzol and toluol out of the gas, but to let it go into the gas and be consumed by every household.

The Coal Controller has informed us, and it is expressed in the report, that it is very important that, in view of the stringency of the

coal position, no change in existing methods of manufacturing gas should be allowed which would have the effect of increasing the consumption of coal or diminishing the use of water-gas plant for supplementing the output of coal-gas plant. Therefore the Order has not been withdrawn, in order to keep down the amount of coal which is being used in the production of gas. But there is not the least doubt —and Mr. Carpenter, D.Sc., pointed this out in a report which is quoted in the Committee's report—that it would cost them in South London £127,000 more if they had kept out of the gas consumed by the South London consumers the incombustibles which reduced the calorific value of the gas. I want to say this is entirely avoidable, without any extra use of coal. That is the main point that we have. The gas goes through the retort into a chamber, and then it is pulled down by a pump. I am informed that if the pressure caused by the pump is too great, a great deal of incombustibles are drawn into the gas, and it becomes, as I have stated, to this extent diluted.

It is perfectly easy for the Gas Light and Coke Company and the Commercial Gas Company, if they choose to be careful and to look after their manufacture properly, to reduce the amount of incombustibles, and not make too great a draw upon the furnaces below the gas when coming out of the retorts. If this were done, there would be no reason why the incombustibles should be any more than they are in the gas in the South of London. We are very great losers in North London by the amount of incombustibles. The whole of the gas passing through the meter is of very poor quality in the North of London. We have no power to take any action while the Ministry of Munitions exists; but we do ask the Council now to send to the Board of Trade the resolution upon the paepr, and put all the pressure we can upon public opinion and members of Parliament, by the London representatives in the House of Commons, to cause this Order to be withdrawn or so amended that these constituents will be restored to the gas and a smaller amount of incombustibles should be mixed with the gas that is consumed. When these things are done, we are of opinion—I think the experts will not disagree on the subject—that there will not be any difficulty in getting gas of a heating value of something like 500 B.Th.U. Before the war it was 540 B.Th.U. I can assure hon. members that the gas they use for heating would be much more effective than it is now, and our kettles would boil more quickly.

We have very great complaint from the poorer population, who get less gas for their penny, and that gas is of less value.

I hope I have not tired the Council; but this is an extremely important matter. I hope the next Council will continue the work we have begun, and exercise all the pressure that is possible on the Gas Companies to get the Order withdrawn, which keeps the heating value of the gas unduly low, and at the same time raises the cost somewhat. I want to conclude by saying that no more coal will apparently be used by the reduction in the amount of incombustibles and by the inclusion of benzol in gas.

The report was received.

Effect of Gas Rationing at Romford.—In consequence of the restrictions placed upon the consumption of gas by the Board of Trade, under the powers of the Household Fuel and Lighting Order, sales of gas at Romford during the past half year were 5·68 p.ct. less than in the corresponding period of 1917. The report adopted at the recent meeting stated that the revenue balance carried to profit and loss account was £3475; and adding a small sum for interest there was a gross profit for the half year of £3487, which, added to the balance brought forward, made an available total of £7724. After providing for depreciation fund, interest on reserve and insurance funds, debenture bonds and consumers' deposits, there remained a net balance of £7010. Out of this sum, the Directors recommended dividends of 5¾ p.ct. on the original shares, and 4¾ p.ct. on the "B" shares, both less income-tax, for the half year. This leaves £4397 to be carried forward.

Financial Position at Burnley.—The Burnley Corporation Gas Department is in an unsatisfactory position consequent on the increased cost of coal and other materials, the increases in wages, and a diminution in the consumption of gas. Whereas there was an estimated profit for the year just closing, there will be a deficiency of £17,000. In September last figures were presented to the Committee showing that the cost of gas was then 3s. 6d. per 1000 c.ft. The Corporation have obtained permission to increase the price by another 6d., which takes effect from the March meter-readings; but as the gas cost this to make last September, and there have been extra expenses since then, it means that, with the prospect of increased cost of coal and workers' wages (the Committee have sent a strong protest against any further advance, as it means the department will become a charge on the rates), there will be another big deficiency next year. The Committee have decided to ask for power to increase the price of gas by another 1s., making it 4s. 6d. per 1000 c.ft.

Cheap Gas at Bath.—Reference has already been made in the "JOURNAL" [*ante*, p. 316] to the changes that have taken place in the Secretaryship and on the Board of the Bath Gas Company, as well as to the results of the past year's working. At the annual meeting, Sir Percy Stothert (the Chairman) remarked that Bath compared very favourably with any other gas undertaking in the United Kingdom. This was largely due to the policy of the Directors for many years past, and also to the most valuable work and services that had been put into the Company by the late Engineer, Mr. C. Stafford Ellery, and by the present Engineer, Mr. J. Wesley Whimster. It was a somewhat extraordinary thing, and a great feather in the cap of the Company, that at the present time they were selling gas the cheapest of any town in the United Kingdom with the exception of Widnes, which was equal to Bath. Widnes was always very much below in the past, because they had a colliery practically at the doors of their works. There was one other corporation that were slightly below—Middlesbrough, where it was 2s. But there they were purchasing coke-oven gas. This was a position to be proud of; and the residents of Bath should, at any rate, consider it with a good deal of satisfaction. They had only increased their price during the war from 1s. 10d. to 2s. 3d. per 1000 c.ft.

HARROW AND STANMORE GAS COMPANY.

The Ordinary Half-Yearly Meeting of the Company was held on Monday of last week, at No. 5, Great Winchester Street, E.C.—Mr. ARTHUR F. PHILLIPS (the Chairman) presiding.

The ENGINEER and SECRETARY (Mr. Charles Chambers) read the notice convening the meeting; and the report of the Directors and the statement of accounts were taken as read.

The CHAIRMAN said this was the ninth occasion on which they had gathered in general meeting since the opening of the war, which had brought so much devastation, misery, and loss to the world. Throughout this long period, the gas industry had probably passed through greater anxiety than any experienced since gas was introduced a century back; and the Harrow Gas Company had had their share. The Directors now looked forward to a satisfactory peace following the armistice, and trusted the Company would not have so many difficulties to contend with in the future.

GAS COMPANIES AND THE WAR.

The Company had all through the period of the war endeavoured to meet the requirements of the Government Departments, as well as acting patriotically to those in their employ called-up for military service. A plant for the extraction of benzol from the gas was at once put down, and successfully worked; and liberal allowances were made to the dependants of those called-up. He agreed with the opinion expressed by so many others, that the gas companies had not received the consideration to which they were entitled for the services they had rendered the country. While the cost of coal, wages, and all other material they required had gone up enormously, gas companies could only increase the price of gas beyond the figure fixed in their Act by sacrificing one-fourth of the standard or pre-war dividend. It certainly could not be laid to the charge of gas companies that they had been profiteering. Far otherwise. They had suffered considerable loss of income in the discharge of a public duty. Lord Moulton, the head of the Ministry of Munitions (who had so often expressed his appreciation of the assistance the gas companies had rendered in prosecuting the war), considered they were entitled to claim help and recognition from the State for whom they had done so much during the past four years.

THE STATEMENT OF ACCOUNTS.

For the first time, so far as his own experience went, there was a reduction in the sale of gas in the past half year, amounting to 3·7 p.ct. This was undoubtedly due to the restriction on consumption by the Fuel and Light Rationing Order. With the great difficulty there had been in obtaining coal, the Company viewed this reduced output with satisfaction. The reduction was only temporary; and there was every reason to consider the business would develop in the future as in the past, as soon as new consumers could be taken on. The Company's district was an extensive and improving one, with an excellent provision of railways; there being no less than six railways and twenty railway stations within the limits. The capital account showed an expenditure of £2992. Of this, £2949 was for a new and larger main to Stanmore, to meet the increasing consumption there and at Hendon. On the other hand, £2907 had been written-off for depreciation, leaving the total capital expenditure only £85 more than the previous half year. The expenditure was equal to 12s. 2d. per 1000 c.ft. of gas sold, which was 2¼d. below what it was the previous year. Ten years ago the capital expenditure was 22s. per 1000 c.ft. sold. The reduction might be considered a satisfactory result for the economy that had been studied. Coal had cost £20,297, against £19,612 in the corresponding previous six months. The half year had had the benefit of a stock of coal purchased before the last rise took place. They commenced the period with a stock of 2419 tons, and finished with only 1192 tons. Carbonizing wages went up from £1744 to £2209. The other expenses were much the same as in the corresponding previous half year—the balance of profit being £9764, against £8335. The price of gas, which was 4d. per 1000 c.ft. higher, of course, contributed to this result; but efficient working and economy had done much to maintain the Company in such a satisfactory financial position. Adding the profit for the half year to the £4620 brought forward, and deducting £2584 for debenture interest and income-tax, left £11,967. The dividend recommended would absorb £6772, leaving a balance of £5194 to carry forward.

COAL AND LABOUR.

The Company, as he had stated, started the half year with a good stock of coal; but the Coal Controller had to withhold the supplies to which they were entitled, to meet the necessities of works that were dangerously short of coal. Since then it had only been by the manager giving the coal question the most constant attention, that supplies had been obtained. Labour had given much anxiety. While they all realized that the remuneration of labour in the past was low, and were pleased to see the position of employees improve, the demands at times might have been unreasonable. The Company were anxious to preserve the best relations with all in their employ, and would give consideration to any reasonable request; but the continual advances made in wages to meet the increased cost of living, and to enable all to live more comfortably, were a considerable addition to the working expenses. The employees all had the full benefit of co-partnership. More than one-fourth of the total number of the Company's employees joined for military service; and he was sorry to say that 10 p.ct. of them had made the great sacrifice.

THE PRICE OF GAS.

Owing to the continual increases in the cost of coal and all other material required, and the considerable addition to wages, the Directors were obliged to give notice last Midsummer of 4d. increase in the price of gas, making it 3s. 8d. per 1000 c.ft., which was reasonable, and much below other companies. In justification of this, he might point out that the price of the Harrow Company's gas had only been

increased 16 p.ct. on pre-war prices, whereas coal had gone up 60 p.ct., retorts, fire-bricks, and all other material required over 100 p.ct., and wages over 80 p.ct.

THE OUTLOOK.

It was difficult to forecast the future. There were at the present time so many uncertainties in front of them. There were the problems of the supply of coal and its cost, and the question of labour and the demands which were continually being made. All he could say was that they had a good works in good order, and an excellent district to supply. All that could be done was to take every possible care to safeguard the Company's interests. The National Gas Council had been recently reorganized on a wider basis, and would, he hoped, before long embrace every gas undertaking, whether company or municipal, so that all important questions affecting the industry might receive proper consideration, and the best advice be obtained on all vital matters. He moved that the report and statement of accounts be received and adopted.

The VICE-CHAIRMAN (Mr. J. W. Lee Glaisher, Sc.D., F.R.S.) formally seconded the motion, which was unanimously adopted without further comment.

THE DIVIDEND.

It was then agreed, on the proposition of the CHAIRMAN, seconded by Mr. A. M. PADDON, that dividends should be paid, for the half year ended Dec. 31, at the rate of 5½ p.ct. per annum on the ordinary stock and 5 p.ct. per annum on the preference stock, both less income-tax at 6s. in the pound.

MR. PADDON RE-ELECTED A DIRECTOR.

The CHAIRMAN moved the re-election as a Director of Mr. Paddon; remarking that he was a most valuable member of the Board.

Mr. F. R. SMITH, who seconded, expressed the opinion that they were to be congratulated upon possessing the services of Mr. Paddon, who had lately been elected a Director of one of the large Metropolitan Gas Companies. This showed that his knowledge of gas administration and technical experience were generally recognized.

Mr. PADDON, returning thanks for his re-appointment, said that, having been conversant with gas affairs for the best part of his life, he could hardly help feeling a little apprehensive of the outlook, which was not so engaging as was the case in the old times. But upon this particular Board troubles did not weigh so heavily upon him, because he was conscious of working under a Chairman who did not leave him a great deal to do. The experience of Mr. Phillips was much greater than his own; and he was the kindest and most considerate of Chairmen.

The retiring Auditor (Mr. James Randall) was re-elected, on the motion of Mr. CHARLES FOX, seconded by Mr. E. DREW.

REMUNERATION OF THE DIRECTORS.

Mr. R. S. BATHE moved that the remuneration of the Directors, as determined by resolution of the shareholders in general meeting on March, 1911, be increased by the sum of £150 each half year. They all he said, knew the Chairman and members of the Board; and after the lucid explanation that had been given them of all the details of the Company's operations, it was unnecessary for him to add anything. They had an excellent Board, who would do their very best in the interests of all concerned.

Mr. E. L. BURTON seconded, and pointed out that it was some nine years since the Directors' fees were last increased; and in the interim the scale of the Company's operations, as measured by the sale of gas, had practically doubled. As a matter of fact, the receipts had more than doubled; for in 1910 they amounted to £47,000, whereas in 1918 they totalled £98,000. If further support were needed, it could be found in the fact that during the past few years the purchasing power of money had vastly decreased; and if in 1910 the Board were worthy of the sum they then received, they deserved very much more to-day. After all, the fee that was proposed was not a great one.

The motion was unanimously agreed to.

A DIFFICULT TIME AT THE WORKS.

The CHAIRMAN next proposed a hearty vote of thanks to their Engineer and Secretary for his services during the past half year; to the Company's staff; and to the whole of the employees. They had had an exceedingly arduous time, but had faced their difficulties and satisfactorily overcome them. Fortunately, he had seen Mr. Chambers when he had been really depressed with the load of responsibility and the difficulties he had to contend with. Indeed, at one time, he believed, his troubles and anxieties—particularly in connection with the demands made by the employees—laid him up. However, he had surmounted all obstacles; and they were now going along very satisfactorily indeed.

The vote of thanks was heartily accorded; but before it was put to the meeting,

Mr. F. J. BANCROFT said he wished to thank Mr. Chambers very much for the stand he made quite recently against unauthorized demands on his works. He had had a very anxious time. If employers were to meet employees on proper terms, these unauthorized and sporadic outbreaks must be stopped; and they were indebted to Mr. Chambers for the attitude he took up. It was very much easier to give way than to resist; but Mr. Chambers successfully resisted, and for this they owed him their thanks.

Mr. CHAMBERS, in acknowledgment, admitted that times had been difficult all through the war. With regard to what Mr. Bancroft had referred to, it was quite true that he had been very much depressed by the attitude adopted by the employees, because, if there was a works in which the men were considered, he could say without boast that it was Harrow. It was therefore a blow to him to find how the men acted. But he had told the Directors that he did not even now blame the employees. A certain amount of reaction was unavoidable after the stress and strain of war; and these men were led on by outsiders. When they threatened to strike in the middle of December, they were altogether misled; and after it had been pointed out to them that they were in error, they very gracefully admitted the error, and promised to keep on. This they had done. He mentioned the matter, because he wished the proprietors to know there was a good feeling among the employees, which he hoped would continue. It was impossible for a manager to work with his employees if this discord existed. The relationship at Harrow had always been excellent; and this state of affairs he should strive to maintain. There were difficulties ahead, they all knew; but he had tried to be optimistic all through the war, and he was still optimistic as regarded the industrial and other troubles which were likely to come along.

Mr. J. W. BUCKLEY proposed a vote of thanks to the Chairman and Directors; referring to their good services, and expressing regret at the absence of Mr. Samuel Cutler, who he hoped would be soon restored to good health, so as to be with them again.

Mr. SAMUEL CUTLER, JUN., seconded the vote, which was cordially passed, and acknowledged by the CHAIRMAN, who said he had had a letter that morning from Mr. Cutler, in which the writer stated that his health was improving very rapidly, and that he hoped soon to be out again.

NO DIVIDEND AT WALTHAM ABBEY.

The Report Referred Back.

On the motion of Mr. J. Eve, the following amendment to the resolution for the adoption of the report and accounts was carried at the annual meeting of the Waltham Abbey and Cheshunt Gas and Coke Company: "That the statement of accounts for the past year be referred back to the Directors, and that they be empowered to call to their assistance Messrs. Cash, Stone, & Co., Chartered Accountants, with a view to the preparation of a statement of accounts showing the position of the Company if proper allocation had been made between capital and revenue. And that, as soon as the Accountants' report has been received, the Directors shall convene a meeting of the shareholders to consider the same, and any recommendations which the Directors consider the report demands; and that this meeting stands adjourned until after the meeting referred to has been held."

The report of the Directors expressed regret that the result of the year's working showed only a profit of £1976, as compared with the previous year's profit of £4576. The report continued: The interim dividends of 6½ p.ct. per annum on the "A" shares, and 4½ p.ct. per annum on the "B," "C," and "D" shares, paid in September last, have, therefore, more than absorbed the available profit for the year; and the Directors do not recommend any further dividend. The cause of this unsatisfactory result lies in the very exceptional conditions that have obtained. The cost of coal, labour, and stores has risen over 30 p.ct. during the year; and the Directors, to meet this, raised the price of gas from July 1, 1918, from 3s. 10d. to 4s. 2d. per 1000 c.ft. Apart from the supply for private consumption, the demand for gas for munition factories has shown a considerable increase. To meet this supply for national purposes, it has been necessary, owing to Government control of coal, to increase the output of oil gas. The Directors had entered into contracts for the supply of the Company's requirements of gas oil at 7½d. per gallon; but these contracts were rendered valueless by the Government assuming control of the oil supplies of the country, and fixing a controlled price of 1s. 4d. per gallon. In the case of the Company's largest consumers for manufacturing purposes, it has, owing to the existence of an old contract, only been recently possible to adjust the price to meet the altered conditions; while the price to be paid for the supply to the Government factories is still *sub judice*, notice to continue a supply being served under D.O.R.A. The price to private consumers has been further raised to 4s. 10d. per 1000 c.ft. The coin-meters are now being altered to the increased price; and to the ordinary consumers the increased price charged comes into force from Lady Day.

The meeting was presided over by Mr. Henry Woodall, who said that the Company had made a contract with Messrs. Nobel in 1915 for three years; and there was no getting out of this contract, though it had proved most disastrous, for the price of oil had gone up. The Company had lost much money over supplying the Government with gas, and had made an application in the matter to the War Losses Commission. They were, however, told that they must have recourse to the High Court.

Mr. Eve said he quite agreed that the price of oil had had a great effect in the profits of the Company; but there was one thing the Chairman might have mentioned, and that was why no charges had been put to capital during the past two years, to say nothing of the two years before then. He would like to ask what was the amount of capital which had been expended during the past two years, which ought to have been allocated to capital, and not to revenue. If this amount had been put to capital, in all probability the Company would have been in a position to pay a dividend now. How much had been spent on new meters and new mains? He was not there on his own behalf, but on behalf of those poor people who were dependent upon the dividends for their living. The Chairman replied that Mr. W. B. Randall (the Secretary and Manager) had worked it out at £1600. Mr. Eve: How much of that has been allocated to capital, and how much to revenue? I am sure you will all agree that anything in the way of new meters and services should not go to revenue, but should go to capital. The Chairman: During the last twelve months we had no charge against revenue, save for the depreciation of mains, meters, &c. Mr. Eve: There was not a penny in the account for depreciation last year. I say it is wrong; and I think that if this meeting could be honestly arranged and conducted, we should talk things over and get to the *crux* of the matter. I want everything straightforward, and I do not see why the information I have asked for should not be given. The Chairman: The information is here, if you think it wise to disclose it. Mr. Randall urged that it would be against the interests of the Company to give, in the presence of the Press, the particulars asked for; but eventually he did so.

SHEFFIELD GAS-WORKERS' WAGES.

At a meeting of Sheffield gas workers, held to consider the report from Mr. C. H. Blackburn (the District Secretary of the National Union of General Workers), in respect of the national movement on behalf of the gas workers for increased wages and reduced hours, it was decided to accept the arbitration award [*ante*, p. 438], which it was stated would bring the labourer's rate up to 60s. 5d. per week.

Mr. C. H. Blackburn said there was nothing they were afraid of the public knowing. In the early stages it was admitted that the Press of Sheffield had done more good to their cause than they had done harm. They were met to review the situation that was created in October last year by an award given to the engineering industry, and they, as representing the gas-workers, claimed that they ought to participate in similar awards that had been granted to the engineering and foundry trades of Sheffield. When they had to meet the Gas Company again to discuss the further advance which had been conceded in the engineering industry, they experienced terrific opposition. Colonel Stephenson, Mr. Hanbury Thomas, and their colleagues maintained that the war was over, and that, while they had during the war period maintained similar advances, the gas-workers did not come under such awards. After correspondence, a deputation met the Directors on Feb. 25, when it was put forward that a National Gas Council had been formed, and so far as the Company were concerned they had become part of that Council, and intended to adhere to any decision that might be arrived at. It became a question of honour as to whether they (the workers) were going to deviate from the programme or stand loyally by what had been decided. The cost of living had increased to such an extent that they were justified in asking for a 5s. grant in December. It meant that they had got to fight unofficially or allow the matter to slide until the National Council brought in their decision. When they got the last award in October, they received nine weeks' back pay, which was more than any other gas workers had received. They were given to understand that there would be no other review until February. In consequence of this, the deputation decided on the policy of waiting until they got the decision through. The Joint Committee had worked very actively, and things went on until a shorter working week was introduced in the engineering and foundry trades; and it was natural that there should be uneasiness among those who were working for 53 hours a week. They tried to get a reduced week put in operation, and they were definitely told by the Company that hours were ruled by the National Council. The municipalities raised strong objection to any further advance. They contended that they were not in a position similar to manufacturers of war material, and had not the opportunity of making excess profits that had come out at various companies, and would have to meet the situation as they found it. They decided to send it to arbitration—known as the Committee on Production. They asked for a 10s. increase for men, an advance for women, anyone working piece-rates, and a similar proportion for those under 18 years of age. So far as the reduction of hours was concerned, they should be very careful as to what decision they arrived at. The Committee were putting up a determined effort for 44 hours.

MORE AS TO GAS IN THE HOUSING SCHEMES.

In the "JOURNAL" last week, a considerable amount of information was given regarding the applications of gas in the new schemes of housing for the working classes. Bearing upon this, a report has been issued by the Committee appointed by the President of the Local Government Board and the Secretary for Scotland, to consider questions of building construction in connection with the provision of dwellings for the working classes in England and Wales and Scotland. The report is an extensive one, covering, with the index, close upon a hundred pages. It deals with sites, lay-out and development, structural topics, and many other pertinent matters. All these must be passed by.

Coming to the immediate matters in which we are interested, it is seen that the Committee have concluded, from the evidence they have received, that there is one clearly-marked tendency which must affect considerably the arrangements of the accommodation and the nature of the equipment which should be provided. It is evident that working-class occupants generally are more and more wishful to eliminate from the living-room the dirty work, and particularly the cooking of meals. For this reason, the plan of house which has been so common in the past in many parts of the country—having downstairs a front parlour and a back kitchen and living-room combined, in which are situated the cooking-range, the sink, and often the copper—is now out of date. The tendency is to require a scullery in which cooking, washing-up, and all other similar work is carried on. The kitchen becomes the living-room in the ordinary sense, which may be kept for use as a sitting-room, as a meal-room, and for the cleaner activities of the family. The older plan of arranging the living-room to serve also as a cooking-room simplified matters. One fire served all purposes, thus saving labour and cost of fuel. In many districts this custom is still common, and will continue for some time to be followed—particularly in rural areas, and in houses where, in addition to the scullery, a parlour is provided. It is evident, however, that a steady tendency is at work to eliminate the cooking from the living-room. Looking to the future, this should be taken into account in planning and equipping new houses. The difficulty of the two fires is partially overcome, in districts where gas for cooking is available at reasonable cost, by placing a gas-cooker in the scullery. In this case, a modified form of fire is sometimes used in the living-room, the grate having an open fire, but at the same time having a little oven and small hob with which minor cooking operations can be carried out. Such types of stoves are very popular, and are made in different forms. Where gas is not available, it is a common custom to have a cooking-range in the scullery. The fire in the living-room is still used for part of the cooking; but this arrangement involves the use of two fires on most days during the winter months.

A little later in the report, the Committee suggest some economical types of houses; and we extract from these the following references, which will be useful to readers concerned in this matter.

Type I.—containing a living-room with cooking-range; scullery with copper, sink, and gas-cooker, or, in the absence of gas, in rural areas, a small grate or stove suitable for drying clothes; the bath situated downstairs, which may be in the scullery, if no other arrangement is practicable, and if it can be closed without cutting off access to the back of the house. The bath, however, is better in a small apartment off the scullery, planned to serve the double purpose of bathroom and wash-house—in the latter case being made a little larger to include the copper as well as the bath, an arrangement which is both economical and convenient for the smaller type of house, in that the water for the bath can be heated in the copper, while the bath itself may be made use of in washing operations.

Type II.—containing a living-room with some modified form of grate intermediate between a cooking-range and sitting-room grate, so that a limited amount of cooking can be done on occasion; scullery with copper, sink, and gas-cooker, and also a grate for drying purposes, or, in the absence of gas, a small cooking-stove. A separate bathroom would be provided, usually on the ground floor; hot water being supplied by means of a boiler at the back of either the living-room or scullery fire.

Type III.—containing a living-room (provided with a sitting-room grate), from which cooking operations are definitely banished; scullery (with copper, sink, cooking-range, and gas-cooker, if gas is available), sufficiently large to enable all the work connected with the cooking and preparation of meals to be carried on there; bath upstairs, hot water supplied from a boiler at the back of the scullery fire.

Dealing with the question of the cooking-range and the position of the boiler for heating water, the Committee make the following remarks: Where the cooking-range is situated in the living-room, the boiler should be placed at the back of the range. Where an intermediate type, partly cooking-range and partly sitting-room grate, is used in the living-room, and a gas-cooker is provided in the scullery, the boiler should be placed at the back of the living-room grate. Where, however, the cooking-range is placed in the scullery and a sitting-room grate is provided in the living-room, the boiler would generally be best placed at the back of the range in the scullery. There will, no doubt, be varying views in different localities as to the position of the boiler for hot water. If placed at the back of the living-room fire, in cases where cooking is done mainly in the scullery, hot water will only be available at times of the day when the living-room fire is lighted, generally in the afternoon and evening; whereas, if placed at the back of the scullery fire, hot water, though available in the morning, would not be available in the evening without keeping the scullery fire in for the purpose. Where, however, a fire in the scullery is required for cooking every day, it would probably be a simple arrangement to heat water from that fire, as it is comparatively easy to bank-up the scullery fire to supply hot water for the evening bath; and in the summer, particularly, it is inconvenient to be obliged to have a fire in the living-room in order to secure hot water. There can be no doubt that, if a really economical system could be found, by which the hot water could be provided from a boiler independently fired with coal, coke, or gas, such an arrangement would be often more convenient than either of the alternatives mentioned. We are further investigating this question, as there appear to be no reliable data showing the relative cost of fuel required for an independently fired boiler and that required for one placed at the back of the coal-fired range. It is generally assumed that a boiler in the latter position gets the benefit of heat which would otherwise be wasted, and does not involve much additional expenditure of fuel. The question is important in reference to the economy of the cottage, because the relative positions of the boiler, the bath, and the scullery sink affect materially the cost of plumbing. When these can all be arranged to require the minimum length of piping, a considerable saving in cost, together with increase in efficiency of the hot-water circulation, can be secured.

A little later, referring particularly to the scullery, the Committee suggest that wherever gas is available, or is at all likely to become available, it is most desirable to provide a space in the scullery for a gas-cooker, on account of the tendency which has already been referred to for working-class tenants to cook in the scullery rather than in the living-room.

As to the lighting, the Committee rather favour electricity; and in this connection, they make the following remarks: The popularity of electric lighting in cottage dwellings is undoubted. Not only does it save considerable expense in the whitewashing of ceilings, re-decorating walls, &c., but it has a much more important advantage as compared with gas, in that this light consumes no oxygen, and does not vitiate the air. We have already seen how difficult it is in cottage dwellings to secure the minimum amount of air-space per person which the medical authorities regard as desirable. Therefore it is an important argument in favour of electric lighting that it may safely be said that, in order that a room lighted by gas may be as healthy to live in as one lighted by electricity, it should contain additional cubic air-space, unless some special and effective form of outlet ventilation be installed to carry off at the ceiling-level the vitiated air as fast as it is formed. In deciding between the two methods where an alternative is available, this advantage in connection with electric lighting should be considered. It appears that finality has not yet been reached in regard to methods of wiring and supply. Evidence was given showing that individual connections to each cottage involve considerable additional cost in proportion to the advantage gained. We think that the question of a common supply from the main in the street for each group of cottages should be carefully considered.

The Committee discuss the different systems of wiring in use, and consider that the best system is to run the wires in steel conduits or tubes with all joints screwed. They agree, however, that this is an expensive system, and that there is some little danger of the wires being damaged when drawn through the tubes, owing to sharp edges due to the threading of the tube ends for screwing. In the course of

evidence they received, it was suggested that the best system, if it could be adopted, would be to have conduits or ducts of fire-resisting material incorporated in the building. They say it would seem that if wooden casing could be replaced by some fire-resisting composition which, while being readily fixed, would be free from some of the objections to the former, this might prove to be the most satisfactory system of wiring. There was agreement in the evidence as to the economy which would result from having a carefully prepared wiring plan for each type of cottage, and making provision for the wiring as the building proceeded, so as to save unnecessary labour in cutting and fitting afterwards.

This preference on the part of the Committee for electric lighting is dealt with to-day in "Electric Supply Memoranda."

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

London, *March* 10.

The volume of business reported during last week in the London tar products market is not large. Pitch still maintains its firm tone at over 65s. per ton net at makers' works. Solvent naphtha is weak, at about 2s. 9d. per gallon net and naked at makers' works, and there is little demand for this article at present. Creosote is steady at from 6d. to 6¼d. per gallon net at works.

In sulphate of ammonia, supplies are being taken regularly in accordance with the Government terms.

Tar Products in the Provinces.

March 10.

The average values for gas-works products during the week were: Gas-works coal tar, 36s. to 41s. Pitch, East Coast, 47s. 6d. to 50s. per ton f.a.s.; West Coast—Manchester 45s. to 46s., Liverpool 45s. to 46s., Clyde 45s. to 46s. nominal. Benzol 90 p.ct., North, 1s. 10d. to 1s. 11d.; 50-90 p.ct., naked, North, 1s. 9d. to 1s. 10d. Toluol, naked, North, 2s. 3d. Coal tar crude naphtha in bulk, North, 8½d. to 8¾d. Solvent naphtha, naked, North, 2s. 5d. to 2s. 6d. Heavy naphtha, North, 2s. 10d. to 2s. 11d. Creosote, in bulk, North, 5d. to 5½d. Heavy oils, in bulk, North, 6d. to 6¼d. Carbolic acid, 60 p.ct., unsaleable. Naphthalene, £20 to £25; salts, £6 to £7, bags included. Anthracene, "A" quality, 4d. to 6d. per minimum 40 p.ct.; "B" quality, 1½d. to 2d.

FROM A MARKET CORRESPONDENT.

Tar Products.

Before dealing with the past week's business, I will reply to the correspondent who, in the last issue of the "Journal," complained that quotations given in these reports are incorrect. Let me say, at the outset, that my quotations, which must be read with my report, are as given to me by manufacturers in various districts. These quotations often differ to a surprising extent in districts which are separated by only a few miles; thus rendering the giving of a true dealing quotation a matter of difficulty. I am also in a position to obtain information relating to exports—quantities, prices, and destination—almost immediately they are made; and the average export prices are also utilized for my report. It sometimes happens that, when notifying me of features and prices, my Provincial friends do not always state whether the quotations they give me are asked, offered, or actually paid—hence the wide range of quotations. Last week's complainant was dissatisfied with my quotation of 1s. 6d. per gallon for carbolic acid in the issue for Feb. 18. I had already explained that the product was unsaleable, and the 1s. 6d. was a nominal price at which makers were offering the article without success. Then he complains that I quoted pitch for the same week at 67s. 6d. to 70s. per ton, and he informs me there were sellers at 65s. I agree. But there were also sellers at 60s. and 76s. during the same week; and the average price of pitch exported from London during the week ended Feb. 15 was 68s. 1d. per ton. There are special reasons for many transactions at higher and lower prices than the market value for the time being; but surely no one would expect those special prices to be returned as the actual market value. Yet that is what I am being asked to do, in many instances. I should like to add that I am not financially interested in the trade—being simply an onlooker; and the onlooker, they say, sees most of the game! At the present time efforts are being made to depress quotations not only in tar products but throughout the chemical trade generally, and manufacturers are consequently inclined to ask rather more than they are prepared to accept. This by the way.

There has been very little change in market conditions during the past week, and time seems to be occupied more with discussions—political, financial, and international—than with transactions. In London, there is a continued demand for pitch for shipment, and quotations are well held at certainly not less than 65s. per ton f.o.b. In the Provinces, makers are firm; and as more tonnage becomes available and freights fall, they should have no difficulty in obtaining more money. Benzol continues to move freely, although the Association's specification is creating controversy. Creosote is a very strong feature; and it is doubtful if an offer of 7d. per gallon f.o.b. would bring forth any great quantity. Solvent naphtha is very dull. Dehydrated tars are in request. Carbolic acid is the worst feature of the market; there being absolutely no business, and, unfortunately, there are no prospects of any improvement. Makers of crude 60's have given over offering, because they cannot obtain a paying price. Crystals, where business has been done, are lower again, and there are still large stocks to be disposed of, which can only be done at heavy loss. It is impossible to attempt any forecast of the future. In France, coal tar products are quieter. Naphthalenes are dull, as stocks are very large, and it is estimated that they should suffice for the whole of next summer. Heavy oil is in better demand, as well as benzol and anthracene; but toluol, xylol, &c., are less inquired for.

The range of home quotations is as follows:

Benzol: 90% London, 2s. 1d. to 2s. 3d. per gallon; 50-90%, 1s. 11d. to 2s. 2d. per gallon.

Carbolic Acid: Crude 60's unsaleable; crystals 40% 5½d. per lb.

Crude Tar: London 40s. to 41s.; Midlands 34s. to 36s.; North 35s. per ton *ex* works.

Pitch: London, 65s. to 70s. per ton; East Coast, 47s. to 49s. per ton; West Coast 44s. to 45s., with Manchester 42s. per ton and Glasgow 47s. 6d. per ton; South Wales, 53s. per ton.

Solvent Naphtha: London 2s. 8d. to 3s. Provinces average 2s. 7d. per gallon.

Crude Naphtha: Naked 1s. per gallon.

Heavy Naphtha: 2s. 8d. per gallon.

Naphthalene: Refined £25 per ton nominal; crude £7 to £13 10s. according to quality.

Toluol: Naked, 2s. 3d. to 2s. 6d. per gallon nominal.

Creosote: London 7d., North 5½d.; heavy oil, 7¼d. per gallon in bulk.

Anthracene: 40-45%, 4½d. to 8d. per unit per cwt.

Grease Oils 18° Tw. (naked) £6 per ton f.o.r. makers' works.

Aniline Oil: 1s. 2d. per lb.

Cresylic Acid: 95% 2s. 9d. to 3s.; 97-99% 3s. to 3s. 3d. *ex* works London; f.o.b. other ports.

Sulphate of Ammonia.

Home movements are steady, and stocks fairly normal. At present British farmers appear able to absorb all the production that is offered to them. At the same time, there are indications that the export trade is being allowed to expand a little. It is, however, difficult to fix what would be considered a fair value for export when restrictions are removed, as neither the present export price nor the domestic value can be regarded as being dictated by market conditions. Some interesting news is to hand from America, which must be held over to next issue.

The Wellington College Fire.—The "Daily Telegraph" says that the cause of the fire at Wellington College last Sunday "is thought to have been the fusion of an electric wire, but there is no certainty on the point."

Municipal Workers' Hours.—The Bury Town Council last Thursday decided to appoint four representatives to a conference to be convened to discuss the question of a 44-hours' week, without reduction of wages, for members of the National Amalgamated Workers' Union.

Reorganization of the Denton Gas Undertaking.—In order to assist in the reorganization of the gas undertaking of the Denton Urban District Council, the Manchester Corporation Gas Committee have lent the services of Mr. Buckley, one of the members of the staff. As stated in the "Journal" last week, the Denton undertaking is in a serious financial state; and efforts are being made to bring about an improvement.

Long Service at Bradford.—Mr. John Harker, of the meter department of the Bradford Corporation gas undertaking, has just completed fifty years' service. He is 77 years of age, and still following his duties with vigour. It is worth noting, in this connection, that the record of long municipal service in Bradford is held by another gas department employee, Mr. Joseph West, a collector, who has had 58 years' service, reckoning in his work under the old Gas Company prior to its being taken over, with the staff, by the Corporation in 1871.

The Salaries Controversy at Halifax.—At the monthly meeting of the Halifax Town Council last Wednesday, consideration was given to the suggestion that the salaries of the chief officials should be increased 25 p.ct., providing the increase did not amount to more than £150 in any case. The Gas Engineer (Mr. W. B. M'Lusky) was involved in the proposal. His present salary is £800. A 25 p.ct. increase would bring it to £1000; but owing to the limit, the maximum would be £950. Mr. M'Lusky's own recent application was only for £900. Very strong opposition was made at the Council meeting; and an amendment to the Finance Committee minutes, that only a 12½ p.ct. increase should be granted, was approved. Later, however, a proposition that the matter be referred back for six months found considerable support; but upon the suggestion of the Mayor (Alderman Howard Clay), this was amended to a period of two months, and carried by 21 votes to 17 in the altered form.

Drogheda Gas Undertaking.—At a meeting of Drogheda Corporation, Mr. Saville, the Gas Manager, reporting as to the general question of gas quality and pressure, said that it was impossible to give either on the basis formerly existing, for reasons quite beyond the Gas Committee's control—coal restrictions, restrictions on lighting, &c. Probably through the greater use of cookers, on account of the coal shortage, they had only been able to obtain a reduction of 3 p.ct. in consumption. This position was untenable, and left them with the alternative of increasing the make of gas per ton or taking the risk of having to close-down during the winter. Adopting the first-named course, with the poor quality of coal supplied, some inconvenience might have arisen; but it was really a case of choosing the lesser evil. He (Mr. Saville) had had a letter from the Coal Controller appreciative of the efforts made to conserve coal, and stating that, so far as gas-coal supplies were concerned, the present position was a difficult one, and was likely to remain difficult for some little time to come. As to the financial aspect, Mr. Saville said, apart from the high cost of coal, fittings and repairs now cost from 100 to 300 p.ct. above pre-war prices; gas prices had increased about 70 p.ct.; and, except in the case of coke, residuals had made no advance. To revert to pre-war methods of manufacture, even if allowed, would mean a charge of 8s. to 9s. per 1000 c.ft.; and such a step would be a penalty on the users of cookers, fires, &c.

Tynemouth Gas Company.

The statement of accounts for the year ended Dec. 31 last shows a revenue of £126,800, and expenditure of £122,554; leaving a balance of £4246 as profit on the year's working. This, added to the balance from last year (£4437) and £498 from the reserve, gives £9181, which the Directors propose to deal with as follows: Interim dividend to June 30 last, at the rate of 5 p.ct. per annum on the consolidated and new ordinary stock, less income-tax, £4456, and interim dividend on the preference stock at 4 p.ct. per annum, less income-tax, £218—£4674; second half-year's dividend to Dec. 31 last on the consolidated and new ordinary stock, at the rate of 5 p.ct. per annum, less income-tax, £4297, and second half-year's dividend on the preference stock to Dec. 31 last, at 4 p.ct. per annum, less income-tax, £210—£4607. The revenue from gas and rentals amounted to £82,806, against £75,425, and from residuals to £43,987, against £36,214 in 1917. The number of ordinary and automatic prepayment meters in use at Dec. 31 last was 23,222; being an increase of 116 over 1917. The price of gas had been increased by 3d. per 1000 c.ft. as from Oct. 1. It is hoped that, through the medium of the National Gas Council, pressure will be again brought to bear upon the Government to afford all gas undertakings a better basis of financial relief from the hardships of existing Acts than that offered in the Temporary Increase of Charges Act, 1918. The Engineer of the Company reports that the works and plant have been maintained in as efficient a state as possible under the present abnormal conditions. Owing to the narrow margin in carbonizing capacity during the past winter, it is necessary that steps be taken to provide for extensions to the plant as early as circumstances will permit; and a scheme of development is under consideration.

Forthcoming Increase at High Wycombe.—The Directors of the High Wycombe Gas Light and Coke Company, Ltd., have decided to raise the price of gas 4d. per 1000 c.ft. from the next quarterly reading of meters. The accounts of the past half year show a profit of £1079, to which has been added £3181 brought forward, and interest £109—making a total of £4369. After payment of interest, and dividends at the rates of 10 p.ct. per annum on the original shares and 7 p.ct. per annum on the additional shares, there will be a balance to carry forward of £2948.

Waste in Smoke.—Writing to "The Times" on the subject of "Waste in Smoke," Sir W. B. Richmond says: We are most of us doing all in our power to save coal, and therefrom are suffering from cold and discomfort. In the meantime, factories, steamers on the river, and traction engines in the streets are belching out tons of coal per diem. The effect of this waste of fuel is to produce the darkest and most smoky winter in my memory. Who is responsible for this waste? The excuse of its perpetrators will be, "We cannot help it." We know by now that it can be helped. Then why, in the name of justice and common sense, are not the waste and nuisance arrested?

A Loss at Dover.

The following is the report of the Directors of the Dover Gas Company for the six months ended Dec. 31: The Company have sustained a loss of £135 on the past half-year's working. To meet this and the interest on the loan capital necessitates the withdrawal of £870 from the reserve fund. The Directors recommend a dividend for the past half year on the stock and shares at the rate of 5 p.ct. per annum (less income-tax). This will further reduce the reserve fund by £1750. The difficulties which the Directors have to meet in carrying on the business show no sign of diminishing. The cost of coal is as high as ever; and the unrest among the miners may result in still higher cost. The salaries and wages of the staff and employees have had to be further increased. Increases are still being demanded in numerous trades; and it may become necessary for the Company to make still further advances. As foreshadowed in the last half-yearly report, the Company applied to the Board of Trade under the Statutory Undertakings (Temporary Increase of Charges) Act, 1918, for authority to increase the price of gas above the statutory maximum, and made out a very strong case in support of their application. The Board, by an Order issued on Dec. 21, authorized the Company to charge up to 6s. 9d. per 1000 c.ft.; and this price is charged to all consumers, ordinary or slot-meter alike, as from the reading of the meters for the Christmas quarter. A difficulty has, however, arisen in the case of slot-meters, owing to the impossibility of altering the mechanism of the meters to fit the increased rate; and the Directors have had to give notice that the increased amount of the charge will be collected from the consumers. The Directors are advised that the time has now come when it is imperative to renew certain parts of the plant; and this they have decided to take in hand at once. During the continuance of the war, it has, of course, been impossible to carry out much needed work; but they trust better times will soon dawn for the Company.

A Good Year at Newmarket.—In formally moving at the annual meeting of the Newmarket Gas Company that the report and accounts for the past year be adopted and a dividend of 5¾ p.ct. be declared, Mr. T. Jennings expressed regret at the absence through illness of the Chairman, Mr. R. Stephenson. He said that, contrary to expectation, they had had a very good year. Mr. J. H. Troughton (the Manager and Secretary), replying to a vote of thanks, referred to the loyalty of the men—remarking that at Christmas time the holders were practically flat; but the supply was maintained, and they had not had a single complaint on account of the pressure being reduced. Frequently coal that was in the bowels of the earth on Saturday was turned into gas and residuals by Monday evening. He was now the oldest servant of the Company, having been with them for 37 years. As a matter of fact, he became Manager when 25 years old, and was then, he believed, the youngest gas manager in England.

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MANCHESTER.

The Fuel Research Board Inquiry on Gas Standards.

The Town Clerk of Swansea is sending authorities a report from Mr. W. R. Herring, on his attendance as representing the Association of Local Authorities Not Owning Gas Undertakings, at a Board of Trade conference, when a report prepared by the Fuel Research Board on "Gas Standards" was considered in private. The Town Clerk states that the conclusions of the Fuel Research Board may raise issues of considerable importance; and local authorities should consider what in their view is best calculated to serve the interests of the consumers in their respective areas. When this came before the Parliamentary Committee of the South Shields Corporation, it was decided—"That, in the opinion of this Committee, a meeting of the Association or its Committee should be held to hear Mr. Herring's further report; and that the Chairman and Town Clerk be authorized, if they think desirable, to attend any conferences of local authorities not owning gas undertakings that may be held to consider this report."

Failure of a Purifier Valve at Retford.—For a short time, Retford gas consumers suffered inconvenience from having to use unpurified gas. At a meeting of the Town Council, the Gas Manager (Mr. J. R. Bradshaw) said he accepted full responsibility for the presence of the unpurified gas in the mains. But he explained that a purifier-valve had failed; and the only alternative would have been to put the town in darkness.

Gas-Works Scheme for Lanarkshire.—An important new gas-works scheme is under consideration by the Middle Ward District Committee of Lanarkshire, who have a memorandum by the District Clerk (Mr. W. E. Whyte). The existing gas-works are, under the scheme when approved, to be acquired by the Committee, and the construction of new and modern gas-works embarked upon, at a total outlay of £400,000.

A Trying Year at Sunderland.—Alderman W. F. Vint presided at the meeting of the Sunderland Gas Company, and moved the adoption of the annual report, which recommended a final dividend of 5 p.ct. on the original stock and 4½ p.ct. on the additional capital stock, less income-tax—the same as the interim dividends paid in September last. He said that, in common with other companies, they had had a very trying year, and had had to meet increased expenditure all round. The wages bill, which in 1914 was £35,000, was now £59,926, despite the reduced staff; while coal, which cost them 12s. 6d. a ton in 1914, was now 22s.—the expenditure at the former price being £62,973, and at the latter £111,019. Fortunately, though things went badly with the Company during the first half of last year, they had picked up considerably during the second half, by the price of residuals having risen. Coke, last year, was 38s. a ton; and he noted that the previous day's quotation on Newcastle market was 70s. The report was adopted.

Salaries at Barrow.

At the Barrow Town Council meeting last Monday week, there was a lengthy discussion on a recommendation to increase the scale of salaries of members of the departmental staffs by £70 each per annum, and to pay those whose salaries do not exceed £370 per annum a war bonus at the rate of £40 a year from Jan. 1 last. In regard to the chief officials, increases were recommended amounting in some cases to £200; and among the recommendations was one that the salary of Mr. F. Chadderton, the Gas and Water Manager, be increased from £400 to £550 per annum—all existing war bonus to merge into the salary. The Mayor referred in detail to the proposals, and pointed out that gas stokers had received an increase of 101 p.ct. on pre-war wages. In regard to the salaries of gas and water managers, an average for thirteen boroughs showed a salary of £640 per annum. They were only paying their manager £400; and an increase of practically one-third was suggested in his case, to bring his salary up to £550. They were considerably below the average of towns of the size of Barrow; and they had to remember that Mr. Chadderton had the management of a very big estate, involving a capital of a million pounds. His responsibilities had been increased during the war by the creation of the branch works at Salthouse. The Council decided to refer back for further consideration the proposals regarding the staffs; and they rejected altogether the increases to the chief officials. This policy was the outcome of opposition from the labour party members of the Council, who objected to increases on an all-round scale as proposed, whether or not efficiency merited it, and to a letter from the Barrow Chamber of Trade asking that the proposals should be deferred for a month to enable the ratepayers to express an opinion on them.

Fatality at the Redheugh Gas-Works.—A Coroner's Jury at Gateshead returned a verdict of "Accidental death" in the case of a foreman stoker at Redheugh, who had been in the service of the Newcastle and Gateshead Gas Company for 47 years. He was knocked down by an engine on the works, and so injured that he died within a few minutes.

Glasgow to Investigate Carbonizing Systems.—It was reported at a meeting of the Glasgow Corporation Gas Committee, regarding a proposal to abandon the horizontal retorts in operation in the Dawsholm, Provan, and Tradeston works, and to erect vertical retorts, that the Special Sub-Committee then appointed had had two meetings, when there were submitted particulars of different types of vertical retorts installed in gas-works in Scotland and England. To enable the Special Sub-Committee to submit a full report and recommendations in the matter, powers were granted to them to appoint a small deputation for the purpose of inspecting such types of retorts as may be considered suitable, and of making arrangements for carrying out tests of any new type of vertical retort with coals of the quality used by the department.

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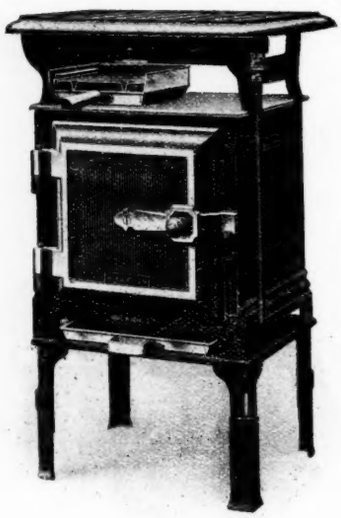

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War Time Supplies of Lindsay Thorium.

The extent to which most of the available sources of monazite sand were controlled by a group of Germans at the outbreak of the war is too well known to need repetition. Home manufacturers of incandescent gas-mantles at that period, owing to the methods of the German trust, who practically doled-out supplies of thorium to English mantle makers by the spoonful, experienced considerable difficulties in obtaining their requirements of this necessary raw material. In this connection, the Lindsay Light Company, of Chicago, claim some credit to themselves for the part they played in contributing to the supplies of thorium to this country during the war. Shortly after the outbreak of hostilities, they were able to announce that they were in a position to send supplies to this country; and throughout the period of the war they have continued to do so. The requirement was naturally a great and an ever-increasing one; but an extension of the Company's factory at Chicago enabled them to keep up regular supplies. Although coming from an American factory, Lindsay thorium is manufactured from monazite sand found in Travancore—a native Indian State under British protection. Notwithstanding the fact that all supplies to this country from the Chicago factory have had to run the gauntlet of the submarine infested area of the Atlantic, only three consignments of the Lindsay product have been lost by enemy action. In order to secure prompt deliveries in future, we learn from the Company's sole European Agents, Messrs. Paul Winn & Co., Ltd., of 72, Mark Lane, E.C.3, that adequate storage accommodation has now been secured practically in the heart of the City.

An Illegal Gas Connection.—A crane-driver at Woolwich Arsenal has been fined £5 for making without permission a connection to a pipe belonging to the South Metropolitan Gas Company. The meter was bye-passed by the disconnection of the inlet and outlet pipes and the joining of them together by means of an india-rubber tube.

East Grinstead Gas and Water Company.—The report submitted at the meeting of the proprietors showed that the receipts from gas-rentals in 1918 were £10,175; from residuals, £2983; and from water, £4368. There was an available balance of £8034, from which the Directors recommended dividends of 9 p.ct. on the "A" shares, and £6 6s. p.ct. on the "B" and "C" shares (less income-tax), leaving £5299 to carry forward. The Chairman (Mr. P. E. Wallis) said that, despite great difficulties, the Company had been able to make about the same quantity of gas as before. During the 25 years he had been a Director, the capital had risen from £28,572 to £92,362, and the revenue from gas from £3342 to £13,158. The profits had gone up from £1312 to £5143; and from an adverse balance of £223 they had turned to a credit of £5299. Mr. J. B. Donaldson, seconding the motion, said the working results showed an improvement all round. Mr. Livesey had carried them through troublous times splendidly. The report was adopted.

The Past Year's Record at Aldershot.

The annual meeting of the Aldershot Gas, Water, and District Lighting Company [of which Mr. R. W. Edwards has since been elected Chairman, in addition to retaining his position as Managing-Director] was presided over by Mr. W. T. Robertson, J.P. The report stated that the total revenue during 1918 was £146,561, and the expenditure £128,574, leaving a surplus of £17,987. After providing for dividends on the consolidated preference stock, and interest on special loans, redeemable mortgage bonds, and debenture stock, as well as the interim dividends paid for the half year ended June 30, the Directors recommended the full statutory dividends on the various classes of stock. The sales of gas, excluding works and special contracts, advanced 1·15 p.ct.; whereas those of electricity showed a decrease of 10·4 p.ct. The Chairman said that before the war the Company were developing very rapidly. As an illustration, he would point to the fact that in 1895 their output was about 95 million c.ft.; and in 1907 it was raised to nearly 275 millions—an increase of 125·7 p.ct. Between 1907 to the end of 1917, the output had again nearly doubled—representing an increase of 98·1 p.ct. This rate of progress, moreover, had been continued until April, 1918, when the first Rationing Order came into operation. Since then the policy of the Government had been, for the purpose of economizing in coal, to discourage the use of gas and electricity. This, of course, arrested their progress, and would doubtless continue to do so until the unfortunate Rationing Order had been withdrawn, when their Sales Department would have the huge task of recovering its lost ground, which required many years of hard work to cultivate and establish. Taking the period of the war, since 1913 to December, 1918, the output of gas had advanced over 50 p.ct.—truly remarkable progress. He went on to deal with the coal and oil difficulties which the Company had experienced and said they felt much grieved last autumn, when they were in great straits, that the Coal Controller should have diverted their coal to another undertaking which was not in a position to make carburetted water gas. They had recently put down in the works machinery for utilizing coke breeze in the making of concrete blocks; and they contemplated the manufacture of briquettes.

The Halifax County Borough Council have confirmed the recommendation of the Gas Committee to accept the tender of Messrs. Drakes, Ltd., for the erection of a vertical retort-stack of a capacity of 2¼ million c.ft. of gas per day.

At a meeting of the local Industrial Association, a letter was read from the Cork Gas Consumers' Company stating that they had extended their operations by putting down a plant for the distillation of tar, extracting from it crude naphtha, light creosote oil, heavy creosote oil, anthracene, and pitch, a ready market for which they expected to find in the South of Ireland. They were also prepared to supply dehydrated tar for road purposes.

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THE POSITIVE DRY PREPAYMENT METER

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Reading Gas Company.

The accounts accompanying the report which was adopted at the annual meeting of the Company showed that the income for the past year was £174,853, and the expenditure £156,181, leaving a balance of £18,671 to go to the profit and loss account. The Directors recommended the payment of dividends for the six months at the rate of 5 p.ct. per annum on the preference shares and ordinary stock; interim dividends at this rate having been declared for the first half of the year. The Chairman (Mr. G. W. Webb, J.P.) said that essential renewals—including a portion of the purifying plant—had been carried out during the year; and he could not speak too highly of the perseverance of their Engineer (Mr. D. H. Helps), and the way he had accomplished work, when to all appearances it seemed well-nigh impossible to move. There was, of course, a considerable amount of renewal work still to be done; and it would be seen from the accounts that they had placed a further amount to the suspense fund to meet the cost. While on the subject of plant, he would like to refer to the gasholder that was brought into use in 1916. Without this, it would have been impossible to have dealt with the increased output; and he would point out that last year, despite restrictions, they sold nearly 100 million c.ft. more gas than in 1914. The balance of gross revenue for the year was £18,671; and after paying interest charges and providing for dividends, there was a balance to carry forward of £2737. In seconding the motion for the adoption of the report, the Deputy-Chairman (Mr. T. E. Hewett) said that though the price in London was now 4s. 4d. per 1000 c.ft., they had managed in Reading up to the present to keep the price down to 3s. 6d. This, he thought, was very satisfactory, and reflected great credit on the Engineer and his staff. It was interesting to note that it was just about 100 years since the Reading Gas Light Company was started. Public lamps were first lighted in Reading on Nov. 5, 1819. The length of the streets then was about 3 miles. There were now 76 miles of gas-mains in Reading, not including Caversham or Tilehurst. The total mileage was 124. In the year 1865, the consumption of gas was 47,000,000 c.ft.; in 1905, 487,620,000 c.ft.; and in 1918, 789,339,900 c.ft. Replying to a vote of thanks, Mr. Helps remarked that it was not easy to carry out extensions during the war. In this respect, they had been fortunate, and had completed the installation of a new gasholder, two purifiers, an exhauster, a large boiler, and a tar dehydrating plant. The work had been executed at a cost very much below prices ruling to-day and likely to be in force for many years to come.

A Report on the Teignmouth Gas-Works.—The Teignmouth Urban District Council, at their meeting last Tuesday, approved of a recommendation of the Gas Committee that Mr. W. Doig Gibb be engaged to report on the condition of the gas-works and the scheme of reconstruction submitted by Mr. H. Higham (the Manager). Mr. French said Mr. Higham estimated that it would cost about £17,250 to carry out what was really necessary to put the works in good condition. If this expenditure was incurred, he anticipated that a saving of £3050 a year would result, and that, after paying the interest and instalment of the loan, there would be a balance of £1000, which was equal to 5d. per 1000 c.ft. on the present output of gas. Mr. Foster opposed the recommendation of the Committee, and suggested that they should obtain the opinion of some independent business man connected with a private gas undertaking. Very naturally the new Gas Manager favoured a big scheme; but they ought to be sure that it was necessary. Mr. F. Full pointed out that there would be a great saving of labour if the improvements were carried out, and thought it would be a mistake to go on "patching and tinkering" with the plant.

Condition of the Ellesmere Port Gas Undertaking.—The inadequate nature of the gas supply has been engaging the attention of the Ellesmere Port Urban District Council. The Gas Manager (Mr. W. Nicholas), in a report, stated that some retorts were so defective, that arrangements had to be made with the Shropshire Union Railways and Canal Company to connect their old service to the Council's main, and so assist in supplying gas to the residents. Then the boiler bulged, and it was stated that the repairs necessary would be a most expensive matter. The manager said that during the three years the gas-works had been running, he had had about twenty stokers who had left the job after working for a few weeks; and if he had been able to get competent stokers, he might have worked the retorts a little longer. In the course of a subsequent discussion on wages, Mr. Nicholas said that if the Council had any doubt about his ability t manage the gas-works, he hoped they would then say what they hac to say. He could assure them he would not trouble them with his services any longer than necessary. The Council decided to instruct the Gas and Finance Committee to recommend the payment of the Birkenhead rate of wages, and to go into the question of securing efficient men for the gas undertaking.

Coal Still Dearer at Eastbourne.—Submitting the report which was adopted at the half-yearly meeting of the Eastbourne Gas Company, Mr. J. C. Towner gave details of what the Company had done for the dependants of their employees who had been called-up for service during the war. First of all, he mentioned that the Company had contributed rather more than a hundred men to the ranks of the combatants. Eleven of these had laid down their lives, and ten had been taken prisoners. The Directors considered it the duty of the Company to assist the dependants of the men during the absence of the latter, and about £10,000 had been expended during the war. He also mentioned that whereas the weekly wages amounted to £280 when the war broke out, the sum expended at the present time was £650. The cost of coal at the pit's mouth was more to-day than when the armistice was signed. Freights by sea, too, had steadily increased; so that they were paying more for seaborne coal than they did during the week of the armistice. He was glad to say that Newhaven Harbour was open again to them; but they were not benefiting as they had the right to expect, by its close proximity to Eastbourne. The Company had loyally endeavoured to back the national effort in fuel economy; and for some time they saved no fewer than 200 tons of coal weekly.

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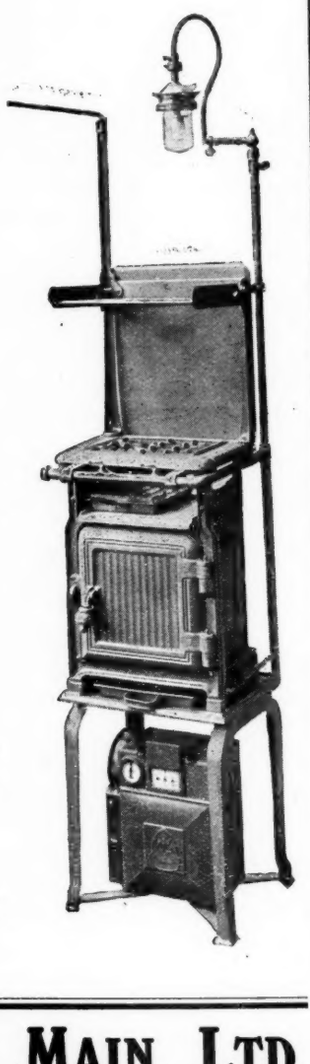

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Shortage of Copper Coins.—The shortage of copper coins is being felt particularly severely in Leeds; and suggestions have been made that the Gas Department ought to distribute more of the coppers secured through slot-meters. As a matter of fact, the department have made every effort to relieve the meters of their contents at shorter intervals, and have recently been able to augment their collecting staff. The accumulations of coins are dispensed to shopkeepers and banks; and about £3000 a week is now collected in copper coins.

Hartlepool Gas and Water Company.—The total revenue of the Company for the year 1918 was £132,683, and the expenditure £98,027, leaving a balance of £34,656 to the credit of profit and loss account, out of which £4770 was paid for interest on loans, &c., and £12,202 as interim dividend in September last. At the annual meeting some days ago, a dividend was declared for the past half year at the rate of 5 p.ct. per annum (less income-tax) on the whole of the paid-up consolidated capital of the Company. The Chairman (Mr. J. Stanley Appleby) said the consumption of gas had been well maintained. In fact, there was an increased consumption for the year of both gas and water, and an improved return from residuals.

Working Results at Blaina.—At the annual meeting of the Brynmawr and Blaina Gas Company, Mr. Alfred Weeks (the Deputy-Chairman), who presided, pointed out that the Directors had experienced considerable difficulties during the year. Not only had the price of coal increased nearly 100 p.ct., but the quality of the coal allocated was very inferior to that used in pre-war days. Wages had advanced over 100 p.ct.; and the price of other materials, including meters, had advanced from 150 to 200 p.ct. The working results, through careful management, had improved considerably. The make of gas per ton of coal carbonized was 12,460 c.ft., an increase of 1100 c.ft. over pre-war figures; and these results were obtained with a coal of very poor quality. The sale of gas per ton of coal was 10,036 c.ft., an increase of 1500 c.ft. compared with pre-war figures. It was resolved to pay a dividend of 5 p.ct. (less income-tax) on the preference and ordinary stock. The shareholders, in passing a vote of thanks to the Directors and staff, expressed their satisfaction that the Board were in a position to declare the pre-war scale of dividend on the ordinary stock. This was very welcome, seeing that this class of stock had not received any dividend for the previous two years. It reflected great credit upon the management.

STOCK MARKET REPORT.

THE Stock Exchange has had a dull week; and a general indisposition to adventure in anything like enterprise, kept business down to very meagre proportions. There was nothing in the course of events of the week to inspire much cheerfulness. The Coal Inquiry did not produce any revelations of a gratifying character; the Armistice deliberations dragged their slow length along; the new capital issues question looked as dark as ever; and Budget forecasts were not exhilarating—and factors such as these were, of course, depressing.

In the gilt-edged market, the tendency of Home Government issues was variable. War Loans opened flat. Later, however, the 4 p.ct. began to revive, and was followed by the 5 p.ct.—the latter finally closing at 95⅛. Consols were easier, and Indian issues dull. Home Rails were little noticed, but the prices at the finish were not the lowest of the week. Canadians were depressed, and Argentines gave way. In the Foreign Market, French Loans had a further fall, but steadied later. Russians were very flat. Japanese were still in favour. The Miscellaneous department shared the general dulness.

Business in the Gas Market was about on a par with the preceding week in point of volume; and some of the minor undertakings came in for more notice than they generally command. But the market seemed to suffer from the same oppressive dulness which characterized all the other departments, and the tendency of prices in general was towards further ease. In the Metropolitan group, Gas Light and Coke ordinary and South Metropolitan ordinary were one point lower. Suburbans were unchanged. In Provincials, Southampton rose 1½. In Foreign, Imperial Continental was 1 lower, and Primitiva ordinary receded ½.

Bargains done for cash during the week were as follows: On Monday, Cape Town 4, ditto preference 7⅞, Commercial 3½ p.ct. 61½, European 12½, Gas Light ordinary 64½, 65, 65½, ditto maximum 56¼, 56½, Imperial Continental 117¼, 117½, 118½, 119, Primitiva 35s. 2¼d., 35s. 7½d., South Metropolitan 69, 69½, 70, 70¼, ditto debenture 55⅛, 56, Tottenham "B" 65, Tuscan 33s. 9d., 35s., Wimbledon 73. On Tuesday, Brentford "A" 76, ditto "B" 72, Continental Union 49½, 50¼, 50½, Gas Light ordinary 64, 64⅜, 64½, 64⅝, 65, Imperial Continental 117½, Southgate 7 p.ct. maximum 99½, 100, ditto 5 p.ct. preference 75½, 76. On Wednesday, Cape Town preference 7⅞, Continental Union 50¼, Gas Light ordinary 64, 63½, 64⅝, 64¾, ditto maximum 55¾, 56½, Imperial Continental 116, 116¼, 117, South Metropolitan 68, 69, 69⅛, South Suburban 79, Southampton 70, Metropolitan of Melbourne shares 8 1/16. On Thursday, Bournemouth "B" 10⅛, British 32¼, Cape Town 4, Commercial 4 p.ct. 64½, Gas Light ordinary 64⅛, 64½, ditto preference 71, ditto debenture 56, Imperial Continental 116, South Metropolitan 68, Southampton 70, 70½, Metropolitan of Melbourne shares 8 1/16. On Friday, British 31⅜, 32¼, Continental Union preference 70, Gas Light ordinary 63½, 64, 64¼, 64½, ditto debenture 56⅛, 57⅛, Hong Kong 8, 8¼, Imperial Continental 116, Primitiva 33s. 9d., ditto preference 55s., 55s. 3d., 55s. 9d., 60s., South Metropolitan 68¾, 68¾, 69.

In the Money Market, rates opened and closed easy, with an intermediate period of firmness. The Bank rate is 5 p.ct., as fixed on April 5, 1917.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue. £	Share.	When ex-Dividend.	Ante-War Dividend & Bonus p.c.	Last Dividend.	NAME.	Closing Prices. July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
189,049	Stk.	Mar. 10	4	4½	Aldershot 4 p.c. Pref.	..	62—67	..
1,551,868	,,	April 8	2½	4⅜	Alliance & Dublin Ord.	59—64	48—50	..
874,000	,,	July 10	4	4½	Do. 4 p.c. Deb.	76—79	61—63	..
280,000	5	April 29	7½	8½	Bombay, Ltd.	6⅞—6⅞	5⅞—6⅛	..
50,000	10	Feb. 26	16	12½	Bourne- 10 p.c.	28—30	21—23*	..
368,110	10	,,	7	7½	mouth Gas B 7 p.c.	15—15½	10—11*	10⅜
115,000	10	,,	6	6/-	and Water Pref. 6 p.c.	13½—14	9—9½*	..
159,740	—	—	—	4½	4 p.c. Deb.	..	66—68	..
992,045	Stk.	Feb. 26	14	37/-	Brentford A Consolid.	261—266	76—79	78
784,920	,,	,,	11	31/3	Do. B New	304—309	70—75	72
55,800	,,	,,	5	6½	Do. 5 p.c. Pref.	109—111	75—80	..
221,400	,,	June 11	4	4½	Do. 4 p.c. Deb.	91—98	63—65	..
217,880	,,	Feb. 26	11	8½	Brighton & Hove Orig.	208—218	140—145	..
244,300	,,	,,	8	5½	Do. A Ord. Stk.	154—159	97—102	..
933,500	Stk.	—	5	5½	Bristol 5 p.c. max.	..	..	..
680,000	20	Mar. 26	12½	10½	British	44—45	31½—32½	31¾—32¼
190,000	Stk.	June 26	4	4½	Do. 4 p.c. Deb. Stk.	88—90	64—66	..
246,771	,,	,,	4	4½	Buenos Aires 4 p.c. Deb.	86—87	60—63	..
100,000	10	—	—	—	CapeTown & Dis., Ltd.	1½—2½	3½—4½	4
100,000	10	—	—	—	Do. 4½ p.c. Pref.	4—6	7½—8½	7¼
100,000	Stk.	June 26	4½	4½	Do. 4½ p.c. Deb. Stk.	70—75	60—65	..
157,150	,,	Feb. 26	5	5½	Chester 5 p.c. Ord.	108—110	..	..
1,513,380	,,	Feb. 12	5/9/4	80/-	Commercial 4 p.c. Stk.	106—108	62—65*	64½
680,000	,,	,,	6¾	26/8	Do. 8½ p.c. do.	103—105	59—62*	61½
475,000	,,	June 11	3	3½	Do. 8 p.c. Deb. Stk.	69½—71½	51—53	..
300,000	,,	,,	7	—	Continental Union Ltd.	76—79	48—53	49½—50½
300,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	70—75	70
51,600	Stk.	Aug. 29	14½	12½%	Croydon A 10 p.c.	..	155—165*	..
278,400	—	,,	11½	9½%	Croydon B and C 7 p.c.	..	130—135*	..
492,370	Stk.	—	5	6¼%	Derby Con. Stk.	128—135	..	..
55,000	,,	—	4	4½	Do. Deb. Stk.	102—104	..	..
1,002,180	10	July 29	10	5/0	European, Ltd.	17½—18	12½—18½	12¾
16,298,975	Stk.	Feb. 10	4/17/4	80/-	Gas 4 p.c. Ord.	93—102	68—65	68¾—65½
2,600,000	,,	,,	8¼	26 8	Light 3½ p.c. max.	76—79	55—57	55½—56½
4,662,935	,,	,,	4	4%	and 4 p.c. Con. Pref.	96—99	70—72	71
4,674,850	,,	June 11	3	3⅜	Coke 3 p.c. Con. Deb.	73½—74½	56—53	55—57½
180,000	,,	,,	10	10%	10 p.c. Bonds	..	..	..
82,500	,,	Mar. 12	5	4½%	Hastings & St. L. 5 p.c.	..	60—65	..
258,742	,,	—	3½	2½%	Do. 5½ p.c.	87—89	45—50	..
70,000	10	April 29	11	6%	Hongkong & China, Ltd.	16½—16½	7½—8½	8—8¼
86,600	Stk.	Sept. 12	9	8½%	Hornsey 7 p.c.	..	117—122	..
181,900	,,	Mar. 12	7½	5½%	Ilford A and C.	151—154	99—97	..
65,780	,,	,,	6⅔	4½%	Do. B	115—118	70—75	..
65,500	,,	June 26	4	4%	Do. 4 p.c. Deb.	92—94	62—65	..
4,940,080	,,	May 14	9	4½%	Imperial Continental	150—160	116—121	116—119
1,235,000	,,	Feb. 12	8½	3½%	Do. 3½ p.c. Deb. Red.	84—86	72—74	..
285,242	,,	Mar. 12	6⅔	6½%	Lea Bridge Ord. 5 p.c.	119—121	93—98	..
2,498,905	,,	Feb. 26	10	42/6	Liverpool 5 p.c. Ord. A	211—218	..	..
						146—148		
806,088	,,	June 26	4	4%	Do 4 p.c. Pr. Deb. Stk.	..	..	..
165,736	,,	Aug. 15	4½	3½%	Maidstone 5 p.c.	..	58—62*	..
75,000	5	June 11	6	3%	Malta & Mediterranean	4⅛—4⅜	3½—3¾	..
250,000	100	April 1	4½	4½%	Met. of Melbourne 4½ p.c. Deb.	99—101	90—97	..
541,920	20	May 28	4	6/-	Monte Video, Ltd.	11½—12	9⅞—9⅞	..
1,875,892	Stk.	July 29	4½	3½%	Newcastle&Gatsh'd Con.	98½—99½	70½—71½*	..
522,785	,,	June 26	3½	3½%	Do. 3½ p.c. Deb.	82—83	57—59	..
55,940	10	Feb. 26	7/14/0	7%	North Middlesex 7 p.c.	14—15	9½—10½	..
360,000	Stk.	May 14	8	8%	Oriental, Ltd.	117—122	103—105	..
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½—7¾	4⅜—5½	..
60,000	50	Feb. 26	18	7½%	Portsea, Island B	128—131	76—81*	..
180,000	50	,,	13	6½%	Do. C	118—121	68—63*	..
249,980	5	April 29	8	—	Primitiva Ord.	5½—6	1½—2	33/9—35/7½
499,960	5	June 26	5	—	Do. 5 p.c. Pref.	4½—5	2½—3½	55/—60/-
531,600	100	June 2	4	4%	Do. 4 p.c. Deb.	91—98	74—76	..
600,000	Stk.	July 31	4	4%	Do. ,, 1911	..	46—49	..
346,198	,,	June 26	4	4%	River Plate 4 p.c. Deb.	86—87	48—52	..
150,000	10	May 14	6	6/-	San Paulo 6 p.c. Pref.	10½—11	7⅜—8½	..
195,000	50	July 1	5	5%	5 p.c. Deb.	47—49	40—43	..
185,000	Stk.	Mar. 12	10	5%	Sheffield A	228—234	85—87	..
209,984	,,	,,	10	5%	Do. B	229—234	85—87	..
528,500	,,	,,	10	5%	Do. C	220—229	84—86	..
133,201	Stk.	Sept. 12	4	4%	Shrewsbury 5 p.c.	..	..	..
90,000	10	May 28	9	6/-	South African.	10½—11½	13—14	..
6,609,895	Stk.	Feb. 10	5/4/0	80/-	South Met. 4 p.c. Ord.	111—118	68—70	68—70½
250,000	,,	July 12	—	5%	Do. Pref.	..	95—97	..
1,895,445	,,	July 10	8	8%	Do. 3 p.c. Deb.	72½—74½	54—56	55½—56
224,620	,,	Feb. 26	8½	5%	South Shields Con. Stk.	157—159	112—114	..
952,795	,,	,,	6	3½%	S'th Suburb'n Ord. 5 p.c.	114—116	76—79*	79
167,558	Stk.	June 26	5	5%	Do. 5 p.c. Deb. Stk.	116—118	89—93	..
647,740	,,	May 14	8	8%	Southampton Ord.	99—102	69—71	70—70½
120,000	,,	Feb. 12	7½	4½%	Tottenham A 5 p.c.	135—138	90—95*	..
789,275	,,	,,	6	3%	District B 3½ p.c.	115—117	65—67*	65
181,955	,,	June 26	4	4%	4 p.c. Deb.	87—89	64—66	..
182,880	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	1—2	33/9—35/-
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	45—50	..
295,476	Stk.	Mar. 12	5	5%	Tynemouth 5 p.c. max.	108½—109	87—88	..
					Wandsworth, Wimbledon, and Epsom—			
90,000	,,	Feb. 26	8¾	85/-	Wandsworth A 5 p.c.	151—156	88—98*	..
265,636	,,	,,	6¼	40/-	Do. B 3½ p.c.	129—134	68—73*	..
108,075	,,	,,	—	38/6	Do. C	..	68—73*	..
140,865	,,	,,	—	38/6	New Ordinary	..	68—73*	..
363,000	,,	,,	6½	35/9	Wimbledon 5 p.c.	117—122	63—73*	73
98,000	,,	,,	6¼	40/-	Epsom 5 p.c.	121—126	70—75*	..
88,416	,,	June 26	3	3%	3 p.c. Deb. Stk.	66—69	50—52	..

* *Ex div.*

Darlington Gas-Works Accounts.—The accounts of the Darlington Corporation Gas Department for the year ended March 31 last show a net profit of £4032. The quantity of coal carbonized was 37,761 tons, and the make of gas per ton 12,544 c.ft. The percentage on make of gas unaccounted for was 5·84. The capital per 1000 c.ft. of gas made is 9s. 11d. The net profit has been carried to reserve.

Gas Profits at Rhyl.—In the course of a Local Government Board inquiry at Rhyl, regarding an application by the Urban District Council for a Provisional Order to increase the maximum price of gas from 4s. to 5s. per 1000 c.ft., and for amending the Local Acts in other particulars, it was stated by the Gas Engineer (Mr. L. G. Hall) that in ten years there had been a profit of £15,011. Mr. Asher (as a ratepayer) asked the Board to restrict the Council to a profit of 2½ p.ct. on the gas-works for the relief of the rates. At the suggestion of the Inspector (Mr. R. C. Maxwell), the Council agreed that the price should not be increased above 4s. per 1000 c.ft. for the relief of the rates; and the Inspector said he thought that they had acted very fairly.

Cork Gas Consumers' Company.—At the 100th ordinary general meeting of the Company on Friday last, Mr. J. J. O'Brien, J.P., who presided, apologized for the unavoidable absence of the Chairman (Mr. W. B. Harrington), whose remarks, however, he had been asked to submit. In these, Mr. Harrington referred to the great loss sustained by the untimely death of Mr. W. C. Magrath (the Manager), who was drowned in the "Leinster" mail-boat disaster. They had got through the half year fairly well; but they had had much trouble and anxiety respecting supplies—more, perhaps, than in any previous six months since the outbreak of war. They were only able to secure a comparatively small quantity of really good gas coal, and had to rely for the bulk of their supplies on Welsh and other coals which were not as suitable as Newcastle for gas production. Unfortunately, this state of affairs continued. They could not yet get Newcastle coal in any quantity. Owing to Government restrictions, they had been practically unable to do any repairs or construction work since the commencement of the war. Now, however, they had big and very important work in this line before them. Sir John H. Scott said he believed that the shareholders and the citizens of Cork generally would endorse the reference to the late Mr. Magrath, who was not only a capable engineer, but a man full of activity, energy, and industry, and one who, in every sense of the word, proved himself a faithful and able servant. A dividend for the half year was declared at the rate of 6 p.ct. per annum on the paid-up capital.

Improved Financial Position at Faversham.—The Chairman of the Faversham Gas Company (Mr. Charles Cremer) had a more agreeable task to perform at the recent annual meeting than was the case twelve months ago, when no dividend could be paid on the original and new ordinary shares. During the past year, notwithstanding the continuance of the working difficulties due to war conditions—difficulties which have not even yet entirely disappeared—the financial position has very substantially improved; and the Directors were able in their report to recommend the declaration of a dividend of 5 p.ct. on the original stock, and of 3½ p.ct. on the new ordinary stock, less income-tax. The gross profit carried to the profit and loss account was £3518, against £1475 the previous year. After a passing reference to the capital account, the debit balance of which had, by a credit in respect of stoves, been reduced to £500, the Chairman said the Company had expended a large sum of money on the retort-house and the machinery therein. As the shareholders knew, the Directors proposed to deal with this out of revenue. In 1917, they dealt with £1000 of the cost, and this year they had dealt with a further sum of £1500, which was included under the head of "repairs, maintenance, and renewal of works and plant." They were hoping to liquidate the balance in such a way that it would not operate as a very appreciable hardship. As the improvement was really a renewal of the old retort-house, they thought this was the proper way of treating such an outlay, having regard to the future welfare of the shareholders. With respect to the output of gas, the figures showed a decrease of about 16 p.ct.—which was undoubtedly caused through the Rationing Order. The new plant in the retort-house had given every satisfaction.

Enterprise in Gas Apparatus.—In an issue published last month, the "Birmingham Daily Post," dealing with the new trade era, the writer—paying particular attention to gas—expressed the opinion that Birmingham might fairly claim to have done more to perfect the modern stove and its numerous congeners than any other city in the world. This claim is challenged by the "Luton News," which asserts that Luton—where the works of the Davis Gas-Stove Company, Ltd., are situated—has contributed as much as, if not more than, any other town to the improvement of gas-using appliances. Attention is directed to what has been done there in connection with "steamless" radiator heating, gas-fire efficiency, gas water heating, industrial furnaces, &c.

Gas Prices and Dividends at Leighton Buzzard.—The large increase in the price of coal, and the extra cost in wages and material, made it necessary for the Leighton Buzzard Gas Company to raise the price of gas in January of last year from the standard price of 2s. 10d. to 3s. 2d. per 1000 c.ft., and again in July to 3s. 6d. Under the sliding-scale, this reduces the dividend payable from 5 to 4 p.ct., which it was at the recent annual meeting agreed to pay. The Chairman (Mr. R. Richmond) pointed out that they were one of the first of the smaller companies to undertake the recovery of benzol and toluol for the manufacture of explosives. From the revenue point of view, the sale of the crude benzol had been satisfactory; but great inconvenience and danger had been caused by heavy deposits of naphthalene which, at some periods, had quite blocked the mains and various connections. One of the holders was practically useless for some time. This deposit of naphthalene often caused excessive pressure on the plant; and on July 29 unfortunately caused an escape of gas, with resultant explosion and fire, by which the Board-room was destroyed. The absence of benzol and other hydrocarbons from the gas had also caused the leathers in the consumers' meters to become hard and brittle. In some cases the meters did not register; and there was not only the difficulty of getting them repaired, but it was impossible to tell whether a reading below the average was caused by incorrect registration, or whether the consumption had been controlled. There was an increase of 8½ p.ct. in the gas sold; and the Manager (Mr. H. G. Ruggles) was to be congratulated on maintaining a supply of gas in spite of adverse circumstances.

The Borough Treasurer of Kendal estimates that the profits of the gas undertaking for the year ending the 31st inst. will be £1235.

The Directors of the British Gas Light Company, Ltd., propose, at the half-yearly general meeting to be held on the 26th inst., to recommend a dividend, payable in April, at the rate of 10 p.ct. per annum (less income-tax) for the six months ended Dec. 31.

As the result of further negotiations with the Ministry of Munitions for the purchase of the toluol plant at New Wortley works for the manufacture of benzol, the Leeds Gas Committee have resolved that the plant be purchased at the price of £6865, subject to the sanction of the Local Government Board being obtained to the borrowing of the necessary money.

The Dowson and Mason Gas-Plant Company, Ltd., of Levenshulme, Manchester, have received an order for a 70 ft. "Weardale" angle bar furnace from Vickers, Ltd., of Barrow-in-Furness. Two similar furnaces were installed in 1910; and this is a repeat order. The firm have also just completed for the Blyth Shipbuilding and Dry Docks Company, Ltd., a 63 ft. "Weardale" frame-heating furnace, and have in hand for Swan, Hunter, and Wigham Richardson, Ltd., for their Sunderland yard, a 45 ft. frame-furnace, and for their Wallsend yard a plate furnace 26 ft. by 6 ft. wide. For the Middle Docks and Engineering Company, Ltd., there has been completed a town gas-fired plate furnace 40 ft. long by 10 ft. 3 in. wide—stated to be the largest town's gas-furnace for plate heating work that has been installed in this country. Other orders include one received from the Pemberton Tin-Plate Company for a gas-fired bogie annealing furnace, 85 ft. long, and one "Weardale" billet-heating furnace, 20 ft. by 6 ft., completed for the Briton Ferry Steel Company.

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